Impacts of PWB's Proposed Filtration Plant on Johnson Creek and Neighboring Waterways

Failure to Satisfy Conditional Use MCC 39.7515(B)

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Exhibit J.19

Cover photo: Sandy River winter run steelhead trout. Photographed by Ian Courter approximately 1 mile from the proposed development site.

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Executive Summary

The Portland Water Bureau (PWB) proposes to build a filtration plant and administrative building complex adjacent to Southeast Carpenter Lane in unincorporated East Multnomah County. The facility is intended to address a variety of potential water quality and system operations issues in addition to addressing Oregon Health Authority's requirement to treat for cryptosporidium, a parasite known to occur in the city's source waters within the Bull Run watershed. PWB has dubbed their filtration plant and administrative building proposal a "mega project," the largest infrastructure project the utility has ever proposed. PWB selected the property at Carpenter Lane outside the urban growth boundary to avoid possibility for public opposition within Portland city limits. In early 2023, PWB submitted their designs and supporting land use application materials to Multnomah County and they presently await a decision.

Due to the importance of agriculture and natural resources in the area, industrial projects such as the one proposed by PWB are not primary, allowed land uses and must meet specific Conditional Use criteria intended to protect agriculture, natural resources, and public safety. In this report we address Conditional Use Criteria MCC 39.7515(B): *Will not adversely affect natural resources.* This criterion is intentionally inflexible to prevent non-agricultural industrial land uses from impacting natural resources in the West of Sandy River Planning Area within MUA-20 zoning. PWB's application materials do not provide analysis of natural resource impacts. Instead, PWB asserts they will use Best Management Practices (BMPs) and mitigate for their impacts during construction and operation of the facility.

There are numerous natural resource impacts that would be expected to occur with an industrial facility of the size proposed by PWB. However, this report focuses specifically on water and fish, two resources that will be acutely impacted if the filtration plant is built at Carpenter Lane. Our report also rebuts written materials submitted by PWB to Multnomah County on August 7, 2023, claiming no adverse effects to Johnson Creek and other waterways proximate to the proposed project site. Materials submitted by PWB were biased and contained several factual inaccuracies and inappropriate subjective statements lacking empirical support.

The proposed site for the filtration facility is located at the headwaters of the Johnson Creek. Plans provided by PWB show that the western corner of the facility will abut the Significant Environmental Concern for Water Resources (SEC-wr) overlay, which includes both the creek and riparian area. The proposed site is also located near Beaver Creek and pipelines necessary to support the facility will need to cross under the creek. Beaver Creek is a tributary of the Sandy River, a nationally designated Wild and Scenic river. All three of these waterways contain salmon and steelhead listed as threatened under the U.S. Endangered Species Act, as well as numerous other ecologically important aquatic species.

Construction and operation impacts from the filtration facility and associated pipelines will have measurable adverse effects on nearby waterways, most notably Johnson Creek, including:

- Significant volumes of sediment will mobilize after rain and large storm events during the years of mass excavation and relocation of 1.25 million cubic yards of soil. Sediment will harm and kill fish and other aquatic species directly adjacent to, and downstream, of the proposed development site.
- Toxicants such as concrete and polycyclic aromatic hydrocarbons will be present at significant volumes through the entirety of construction and operation. These on-site toxicants generated from vehicles, machinery, accidental spills, waste, and construction materials, such as dry and liquid concrete, will be mobilized during runoff events harming nearby and downstream aquatic and riparian species
- Thermal pollution from runoff heated on impervious surfaces, warm water released from holding ponds, and increased flow ramping are among the other factors will adversely affect nearby and downstream aquatic and riparian species

Adverse impacts of PWB's proposed filtration plant and administrative building complex on water quality and fisheries resources in Johnson Creek are indisputable. The proposed industrial project is extremely large, will be very close to the headwaters of Johnson Creek and other waterways, requires a large area of impervious surface, and will discharge warm, turbid, and toxic water into the creek. No empirical data or analytical framework has been provided by PWB to formally evaluate any of these impacts. Instead, PWB's land use application materials acknowledge these impacts are going to occur. Mitigation measures are offered and use of BMPs are pledged to attempt to reduce the effects. However, this approach does not satisfy Conditional Use Criteria MCC 39.7515(B) because it acknowledges there will be impacts. Furthermore, BMPs are seldom implemented to perfection during large construction projects. For example, PWB contractors recently excavated a large hole at the proposed site. The excavation was carried out using BMPs, including runoff control for stormwater purposes, but attempt to contain rainfall did not prove to be effective. We observed rapid filling of the excavation site with water within just a few days. Uncontained, sediment-laden runoff was discharged into Johnson Creek during, and two days following, a large storm event.

We urge the hearings officer to deny PWB's application for a Conditional Use permit for a filtration plant and administrative building complex at Carpenter Lane in East Multnomah County. Project proponents fall far short of proving they can satisfy Conditional Use Criteria MCC 39.7515(B). Conversely, PWB's proposed project will have severe impacts on Johnson Creek water quality and fisheries resources.

Background

The Portland Water Bureau (PWB) is required by the Oregon Health Authority (OHA) to construct a facility capable of treating for a parasite called cryptosporidium, which causes non-life threating illness, such as diarrhea and stomach pain, but can cause more serious illness in immunocompromised patients. The Environmental Protection Agency (EPA) mandates treatment for cryptosporidium when municipal water suppliers utilize uncovered surface water sources because the parasite can enter the water supply through animal feces. Although cryptosporidium detections are rare at the source of Portland's water supply, and there have not been any cryptosporidium detections at the point of consumer use, nor cases of infection linked to PWB water, OHA is requiring treatment. To meet this requirement, PWB has applied for a Conditional Use permit for a water filtration plant at the east end of Carpenter Lane in rural east Multnomah County within the West of Sandy River Planning Area. The proposed 90-acre parcel is zoned Multiple Use Agriculture-20 (MUA-20)[1]. The $2 billion industrial facility with a 50-acre footprint is expected to require 5-7 years for construction and would primarily serve municipal water users in the City of Portland.

PWB proposed filtration in 2018 as its preferred treatment option because they wished to address numerous other water quality and system operations issues unrelated to OHA's requirement to treat for cryptosporidium. They also sought a new administrative office building, which they intended to construct within the grounds of the filtration plant. PWB has dubbed their filtration plant and administrative building proposal a "mega project," the largest infrastructure project the utility has ever proposed (Portland City Council hearing, June 28, 2023)[2]. To avoid possibility for public opposition within Portland city limits (Jacobs Engineering 2018), PWB selected the property at Carpenter Lane outside the urban growth boundary. Facility design began in 2018. In early 2023, PWB submitted their plans and supporting land use application materials to Multnomah County, and they await a decision from the hearings officer assigned responsibility for determining whether the proposal meets specific conditions (MCC 39.7515(B)).

There were several apparent reasons for PWB's site selection. First, the 90-acre parcel was already owned by PWB[3], and it was large enough to support the footprint of the proposed facility (approx. 50-acres). Second, it was conveniently located–close enough to downtown Portland that city employees and officials could commute within 45 minutes, but far enough such that it is surrounded by natural beauty in a rural area. Finally, PWB preferred this site over alternatives within the city limits because the communities of Cottrell and Pleasant Home are agricultural

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[1] Multiple Use Agriculture-20 (MUA-20) is a land use zoning category for agriculture and low-density housing. Conditional Uses, including public utility facilities that primarily serve the local area, are allowed, but they must meet specific criteria intended to protect agricultural practices, natural resources, and public safety. Non-agricultural commercial or industrial activities are not allowed.

[2] https://www.youtube.com/watch?v=ZXnhs1lN8YM, statement made at 1:34:45 by Jodi Inman

[3] The 90-acre parcel selected for the filtration plant proposal was condemned by the City of Portland in 1975 to be used for an above-ground reservoir, but the reservoir was never built, and the city did not return the property to the farmer. Instead, the land was leased back to the farmer.

towns with low housing densities, alleviating PWB's concerns about major public opposition to the project.

However, there were several substantial problems with the site. First, the property was not located along PWB's existing Bull Run water pipeline and did not meet the land elevation parameters for their gravity fed system, requiring PWB to propose spending an additional ~$200 million to construct new pipelines to the facility and dig the site down to an elevation necessary to support gravity conveyance[4]. Roughly 1.25 million cubic yards of dirt would need to be removed from the property to make its elevation suitable, and approximately 4 miles of new pipeline would need to be laid. When PWB proposed the site in 2018, they began immediately purchasing additional private property and pursuing new easements to make way for the necessary pipelines. Significant portions of the pipelines transit through Clackamas County, much of which is zoned Exclusive Farm Use (EFU), further challenging efficacy of the plan. Not surprisingly, several of these new land and easement acquisitions are currently tied up in legal disputes, making completion of the pipeline uncertain.

Secondly, the proposed site is surrounded by significant natural and cultural resources. The property in question and much of the surrounding area has been designated a "Rural Reserve" by Multnomah County because of the quality of soil and prevalence of agriculture. Indeed, the property has been cultivated as farmland since the community of Cottrell was established in the late-1800s. The site is also culturally important to Native Americans. The Confederated Tribes of Warm Springs and others used the area extensively prior to European settlement as evidenced by local artifacts, many of which are still in the possession of the area's residents.

A third problem with PWB's site selection involves a zoning matter. Due to the importance of agriculture and natural resources in the area, industrial projects such as the one proposed by PWB are not primary, allowed uses within MUA-20 and must meet specific Conditional Use Criteria intended to protect agriculture, natural resources, and public safety. The West of Sandy River Land Use and Transportation Plan (2002) explicitly defines a vision for the region and lays out numerous policies to guide future development. Consequently, MUA-20 has very strict Conditional Use Criteria. For example, projects that receive a Conditional Use permit *Will not adversely affect natural resources* (Conditional Use Criteria MCC 39.7515(B)). This condition is unequivocal. There is no qualifier for minimizing effects nor mitigating for effects, and the relative magnitude of effect is not defined. This was intentionally inflexible on the part of Multnomah County planners to prevent non-agricultural industrial land uses from impacting natural resources.

There are myriad of natural resource impacts that would be expected to occur with an industrial facility of the size proposed by PWB, but this report focuses on two resources that will be acutely impacted if the filtration plant is built at Carpenter Lane. These are water and fish. While

[4] Cost of pipes as of 2019

the burden of proof is with the applicant, and they should quantify their expected effects on all natural resources in the area including minerals, air, forest, wildlife, and soil, we aim to demonstrate specific effects on water and fish so that Multnomah County and the hearings officer presiding over the land use decision can clearly see an example of why Conditional Use Criteria MCC 39.7515(B) is not satisfied. We felt it was appropriate to focus on water and fish because of our professional expertise (Appendix E). This report also rebuts written materials submitted by PWB to Multnomah County on August 7, 2023 that claimed no adverse effects to Johnson Creek and other waterways proximate to the proposed project site. Materials submitted by PWB were biased and contained several factual inaccuracies and inappropriate subjective statements lacking empirical support.

Water Quality Impacts

Proximity to waterways

The proposed site for the filtration facility is located at the headwaters of the Johnson Creek (Figure 1). Plans submitted by PWB show that the western corner of the facility will abut the Significant Environmental Concern for Water Resources (SEC-wr) overlay, which includes both the creek and riparian area. The facility's overflow basins are sited immediately adjacent to the riparian area and approximately 350 ft from the creek itself. The topography of the site is uneven and elevation varies from 720-740 ft at the property's NW, NE, and SE corners and slopes to 660 ft. at the SW corner and western edge of the property. Based on the topography and observations during and following storm events, runoff naturally flows toward the portion of the property with the lowest elevation at the SW corner toward Johnson Creek's riparian area, with some flow at the western edge of the property feeding into a small tributary of Johnson Creek. Exhibit H.1 (pg. 24) also clearly demonstrates elevation and existing overland flow.

The proposed site is also located less than a quarter mile from the north fork of Beaver Creek and approximately 1 mile from the middle fork of Beaver Creek. The finished pipeline route is proposed to cross the middle fork of Beaver Creek. Beaver Creek is a tributary of the Sandy River, a nationally designated Wild and Scenic river.

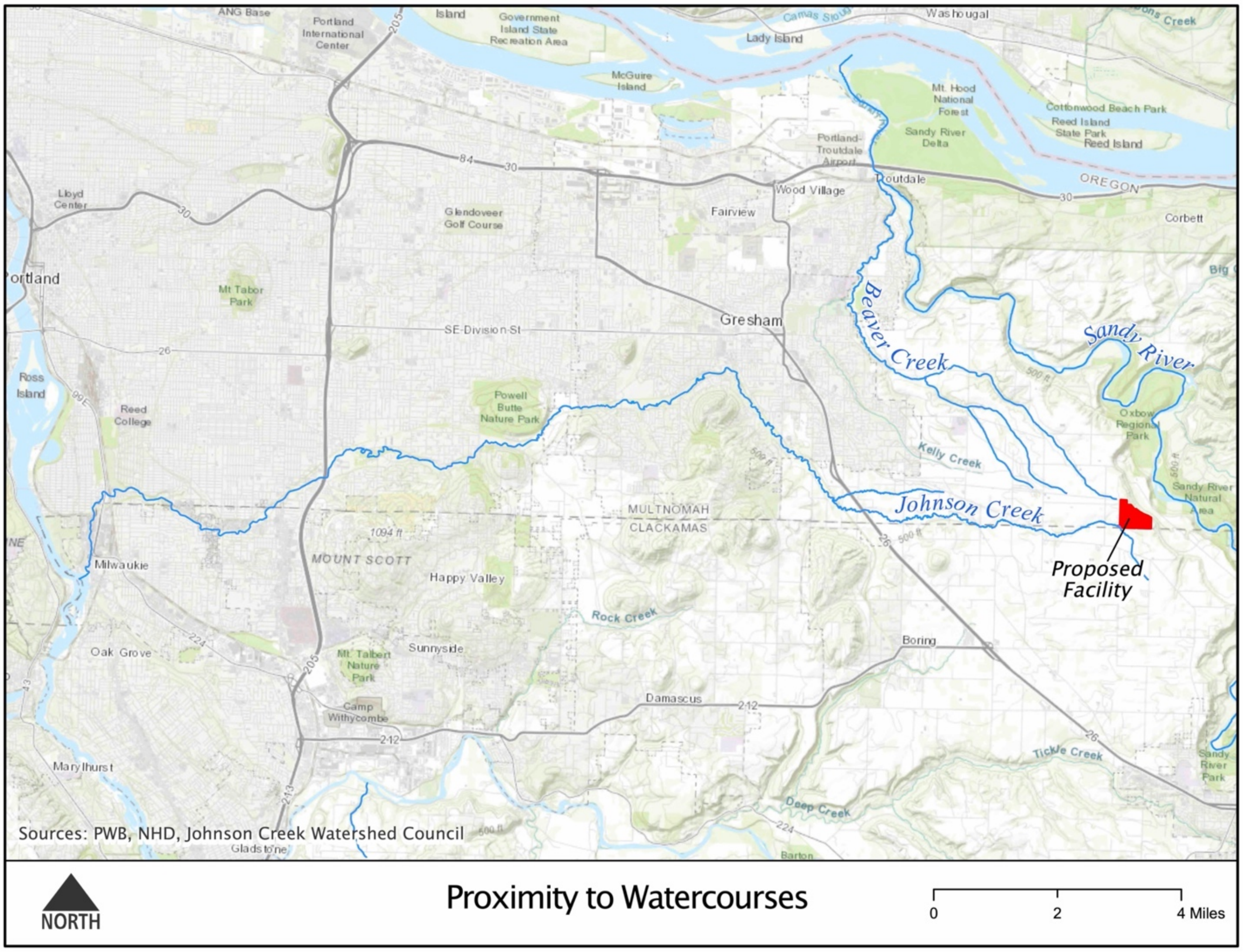

Figure 1. Proposed filtration facility location in relation to nearby waterways.

Runoff and Sediment

Construction impacts from the filtration facility and associated pipelines will have measurable adverse effects on surrounding waterways, most notably Johnson Creek. Soil and sediment will be mobilized after rain and storm events during the 5-7 years of construction, particularly during the 1-3 years of excavation and soil work. PWB anticipates approximately 1.25 million cubic yards (CY) of soil will be excavated from existing land. A portion of the excavated soil volume will be permanently removed from the property and delivered offsite and upwards of 600,000 CY to be stored at a stockpile location on the eastern portion of property (see Figure 2). In addition to the machinery required to excavate, heavy trucks will be accessing the construction site to mobilize approximately 100 loads of soil per day which is estimated to occur for at least two years. Due to PWB's goal to have the facility operational by 2027, earthwork and mass excavation work will have to occur year-round with upwards of 10 hours per day and six days per week and throughout the rainy season (MWH-Kiewit 2023).

The extreme ground disturbance during excavation in combination with consistent precipitation and storms during the winter and spring will lead to overland flow and significant sediment runoff into Johnson Creek and the unnamed tributary of Johnson Creek on the western edge of the property. As soil saturation increases over the winter months, soil infiltration capacity decreases, naturally resulting in stormwater pooling and overland flow. As stated in Exhibit H.1, infiltration rates at the site are extremely low, therefore runoff is expected to begin at the start of the rainy season and any rain event for 24 hours or more generating more than 0.5 inches will cause significant runoff. Aside from potential mitigation methods highlighted in engineering sketches (e.g. Exhibit I.100) to implement runoff control, PWB has not provided Multnomah County with specific plans for erosion and sediment control during construction. We believe PWB cannot prevent significant and harmful runoff, even while using BMPs. For example, PWB contractors recently excavated a large hole on the proposed site. The excavation was carried out using BMPs, including runoff control for stormwater purposes. However, the attempt to contain rainfall did not prove to be effective (Figures 3 and 4). We observed rapid filling of the excavation site with water, and uncontained runoff continued to occur at least two days following a large storm event that totaled approximately 1.5 inches[5] of rain. It should be noted that BMPs are seldom implemented to perfection during large construction projects. Figures 3 and 4 clearly show ineffective sediment containment and runoff control measures with poorly secured containment fences and mesh blankets.

The only submittal to the county with regards to erosion and sediment control submitted to date regarding construction is a general 1200-CA permit issued to PWB for any Capital Improvement Project and not specific to the proposed filtration project and associated pipelines. As of August 25th, 2023, PWB does not have approval from the Oregon Department of Environmental Quality (DEQ) because they have not submitted or received approval for an Environmental Management Plan nor a Sediment and Erosion Control Plan specific to the proposed project (*personal*

[5] https://www.wunderground.com/history/monthly/us/or/portland/KPDX/date/2021-12

communication, L. Courter with B. Benninghoff at DEQ) (Attachment B). Last, the best management practices (BMPs) and methods PWB will implement to achieve their goal of pre-development conditions are "*designed to minimize impacts*" (Exhibit H.1). As stated in Exhibit H.1 for facility operations, stormwater discharge will occur "*offsite in a separate stormwater system*," identified as the headwaters of Johnson Creek (Exhibit H.1). Efforts to minimize impacts to Johnson Creek, its riparian area, and associated natural resources is not consistent with the Criteria MCC 39.7515(B), *no adverse effects on natural resources*.

PWB indicates that stormwater and any groundwater produced during facility construction (i.e. dewatering) will be discharged into Johnson Creek (MWH-Kiewit 2023) which will be "*in compliance with the project's 1200C permit*." As stated previously, a general 1200-CA exists, but no 1200-C permit specific to the filtration and pipeline projects have been approved by DEQ. Because no management or erosion control plan is in place, it is unclear how PWB plans to achieve promised "pre-development" levels to comply with the county's Criteria MCC 39.7515(B), ensuring no adverse effects after discharging stormwater and groundwater into Johnson Creek. Furthermore, PWB has not submitted any pre-development data or baseline conditions on important parameters, including current aquatic species inventory, seasonal flow conditions, water quality conditions, and contaminant levels in Johnson Creek. Furthermore, Johnson Creek is listed under the EPA's Clean Water Act 303(d) designation ("impaired" for fish and aquatic life)[6], requiring the state to ensure watershed-wide improvement to parameters currently exceeding acceptable levels. These include the following water quality parameters: temperature, dissolved oxygen, fecal coliform, nitrate nitrogen, total phosphorus, pH, ammonia, polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) (Figure 5). Any increase in these parameters conflicts with Criteria MCC 39.7515(B) and the goals set forth by the 303(d) designation due to its adverse effects on aquatic life, including salmonid migration, spawning, and survival.

During operation of the facility, stormwater runoff will carry any residues from impervious surfaces into Johnson Creek. This includes solvents, oils, hydraulic fluid, fuel, and any chemical spills from the variety of chemicals stored on site. Although PWB claims that the chemicals used are common in drinking water facilities across the nation, it is important to underscore that any chemical – those deemed extremely or mildly toxic – is toxic in large enough quantities. As summarized in Exhibit D.1, nine of the total chemicals to be on site are corrosive, toxic, oxidizing, combustible, and carcinogenic. These chemicals are transported and stored at very large volumes, and any accidental spill or accident with transport and delivery before or during a rain or storm event would increase contamination risk to the surrounding ecosystem. Water filtration chemicals touted as "safe", such as sodium chloride and potassium chloride, are fatally toxic to sensitive amphibian species and juvenile mussels at low concentrations (parts per billion), such as those present in Johnson Creek. Higher concentrations (parts per million) of these "safe" chemicals are toxic to fish.

[6] https://www.deq.state.or.us/lq/ECSI/ecsidetail.asp?seqnbr=4020

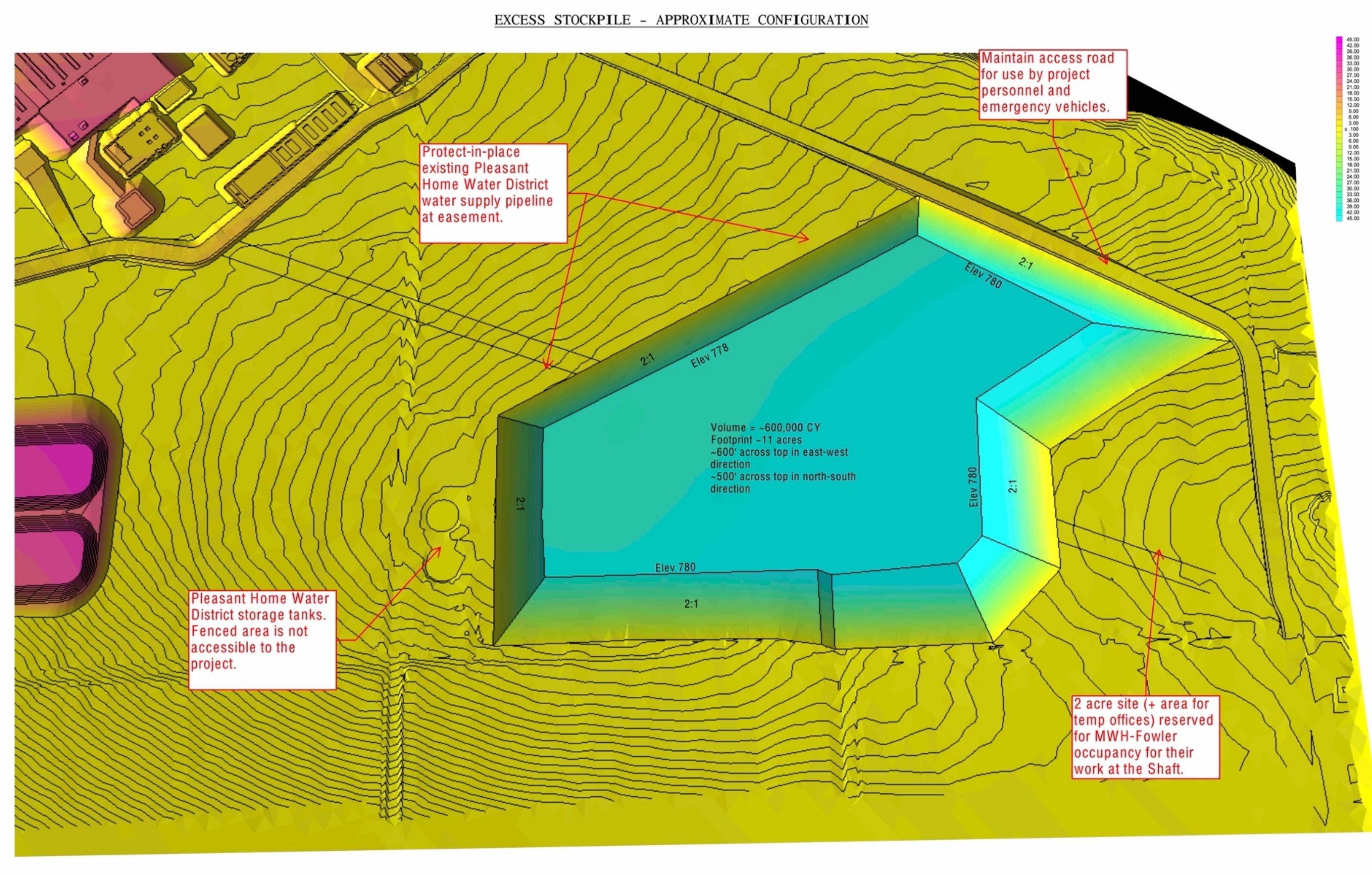

Figure 2. Location of anticipated stockpile of 600,000 cubic yards of excavated soil from facility footprint (MWH-Kiewit 2023).

Figure 3. Accumulated rainfall and resulting runoff from a large excavation carried out by PWB's contractors during an assessment on the western edge of the proposed project site looking southwest. Photo taken two days following a large, five-day storm event totaling approximately 1.5 inches, December 24, 2021.

Figure 4. Runoff from a large excavation carried out by PWB's contractors during an assessment on the western edge of the proposed project site looking south. Photo taken two days following a large, five-day storm event totaling approximately 1.5 inches, December 24, 2021. Full video submitted as separate testimony, File name: *JCReport-Dec-24-21-Pond.MOV.*

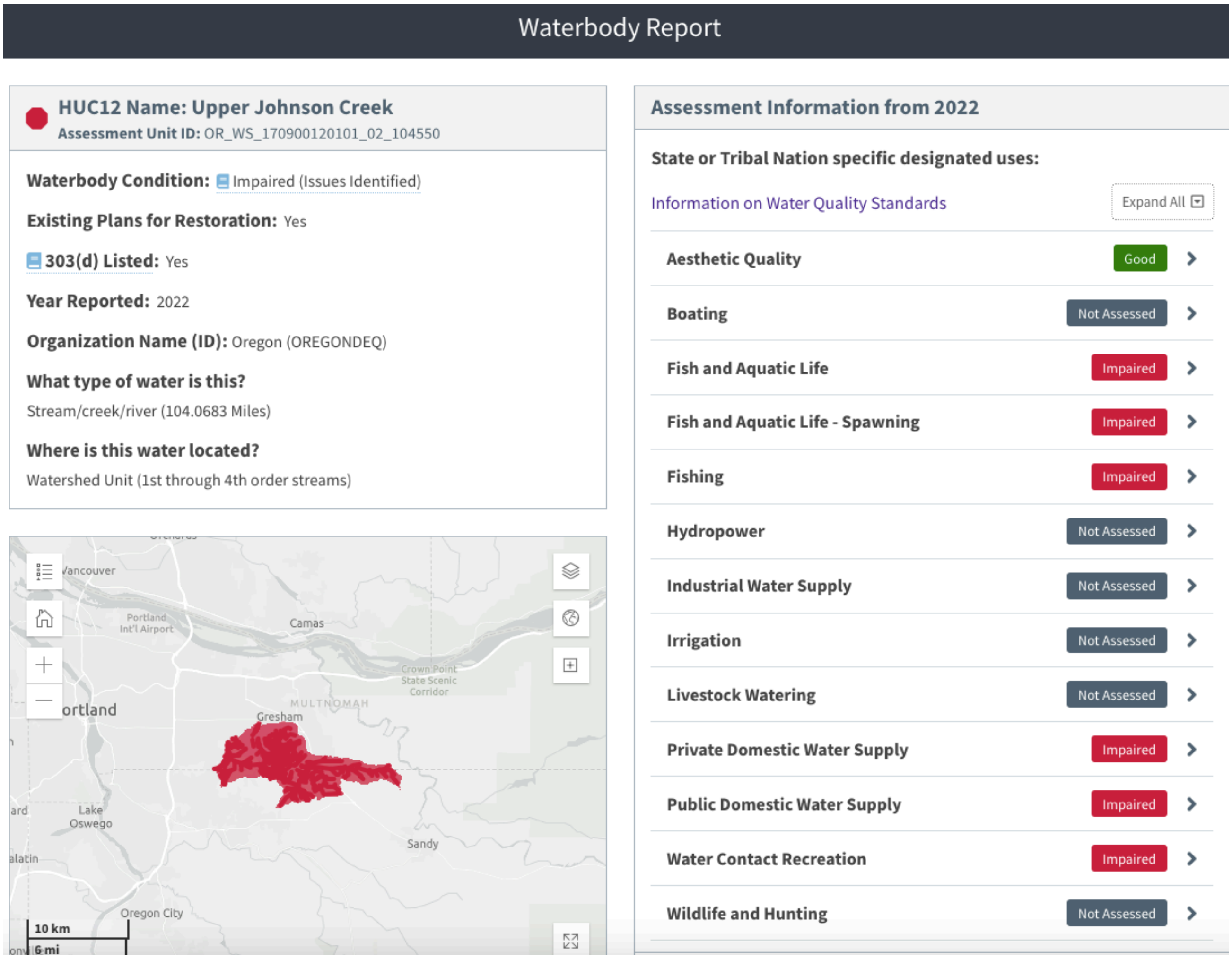

Figure 5. 303(d) designation of the Upper Johnson Creek watershed. https///mywaterway.epa.gov/waterbodyreport/OREGONDEQ/OR_WS_170900120101_02_104550/2022, accessed 8/24/2023

Adverse Effects of Toxicants

According to exhibits provided by PWB, many toxicants will be present during construction and operation, presenting ongoing threats to surrounding natural resources. During construction, on-site toxicants generated from vehicles, machinery, accidental spills, and construction materials and waste will be mobilized during runoff events. During facility operation, toxicants derived from accidental spills, normal releases from vehicles, or negligence will be mobilized across all impervious surfaces. The greatest and most immediate impacts from the filtration facility will occur in Johnson Creek. Regardless of best management practices and minimization measures designed to prevent or contain toxicant mobilization, any spill or release of these chemicals into Johnson Creek would cause an adverse effect on natural resources. It is practical to assume that a chemical-laden runoff event will occur given the considerable scope and scale of the project. By implementing BMPs, PWB admits such incidents will occur and every effort will be made to minimize impacts (Attachment C). Minimizing impacts does not meet the standard of Conditional use Criteria MCC 39.7515(B): "*no adverse effects on natural resources*." Release of toxicants into Johnson Creek will cause acute and chronic effects. The greatest potential for acute toxic effects would occur during accidents and large storm runoff events. Given that construction will occur for several years, there is also the potential for chronic effects on surrounding vegetation, the riparian area, and aquatic life present in Johnson Creek. Toxicants associated with the construction and operation of the proposed filtration facility have known adverse effects on aquatic life, including, but not limited to fish, shellfish, aquatic and terrestrial vegetation, and invertebrates. In general, we discuss two categories of toxicants with the biggest risk to Johnson Creek: concrete and organic pollutants.

Concrete

Concrete is comprised of aggregate (sand and gravel), water, and cement. Cement is the binding agent and the component of concrete known to be toxic due the presence of metals (Hillier et al 1999; Butera et al 2014) and PCBs and PAHs (Butera et al 2014). The composition of cement generally includes lime, silica, aluminum oxide, iron oxide, magnesium oxide, gypsum, and trace amounts of chromium in the form of chromate[7]. In addition to chromium, cement also contains trace amounts of other toxic metals, such as arsenic, beryllium, lead, nickel, and vanadium. Vanadium, chromate, sulfate, and chloride have been shown to leach from non-mixed and non-cured concrete into surrounding surfaces (Hillier et al 1999; Butera et al 2014). Heavy metals such as those present in concrete, can have acute toxic effects (e.g. mortality) and chronic effects due to bioaccumulation in tissues (e.g. endocrine, olfaction, and reproduction impairment).

Lime makes up more than 60% and is the component that makes cement highly alkaline (pH 11-13) and water soluble. Lime's high solubility allows for efficient mobility of cement compounds through soil, increasing contamination risk to surrounding drainages during stormwater runoff, accidental discharge into surface water, and seepage into groundwater. Any storage of concrete effluent (e.g. equipment and truck washout, stormwater) in holding ponds or designated washout areas poses a risk to local groundwater sources and also surface water in the incidences of overflow during large storm events. Furthermore, rainwater polluted with concrete washwater percolates through the soil, altering soil chemistry and inhibiting plant growth. Concrete's high pH can also increase the toxicity of other toxicants in surface waters and soils (U.S. EPA 2012). For example, aluminum, found to be present in cement, causes greater mortality in salmonids within increasingly alkaline water (Everhart and Freeman 1973; Hunter et al 1980).

Although cement's toxic metals and organic compounds are found at trace levels, the ecotoxicological risks at the proposed site are magnified due to the sheer volume of concrete needed to be poured in a short duration of time. It is estimated that a total of 40,000-45,000 cubic

[7] Under oxidizing conditions (alkaline), chromate yields the carcinogen chromium-6 or hexavalent chromium. Hexavalent chromium exhibits high water solubility and attenuation occurs in the presence of reducing compounds.

yards[8] of concrete is required for constructing the inlet structure, ozone contact basin, flocculation basins, sedimentation basins, filtration basins, CT basins, wash water basins, clear wells, waste wash basins, gravity thickener, sludge storage tanks, and overflow basins (*see B. Oswald correspondence* cited in Exhibit D.1). The total volume is a conservative estimate, as it does not include the concrete required for other structures, including, but not limited to, storage facilities, administration buildings, sidewalks, and footings necessary for the construction of the communication tower. Given the volume of concrete and the speed at which construction must occur, it is unlikely that the PWB and its contractors can prevent concrete accidents and contamination on the surrounding sensitive ecosystem. BMPs, mitigation measures, environmental management plans are always required by counties and agencies, such as Oregon DEQ, prior to large construction projects. Nevertheless, concrete accidents remain common during construction, particularly during large industrial projects. Given the scope and scale of industrial projects, any accident has severe consequences on the surrounding ecosystem even if response times are relatively quick. For example, a recent concrete spill from a highway project occurred within a similar size stream as Johnson Creek, causing increased pH and significant mortality of cutthroat trout and brown trout near Salt Lake City (Figure 6).

Figure 6. Trout carcass following accidental 2021 concrete spill into Utah Creek. Photo from Salt Lake Tribune article: https://www.sltrib.com/news/environment/2021/07/30/concrete-spill/

[8] Volume roughly equates to 14 Olympic swimming pools

Concrete is alkaline (pH > 11) and when in contact with water, it raises water's alkalinity beyond conditions appropriate for fish and aquatic life (McLeay & Associates 1983; U.S. EPA 2012). Highly alkaline conditions resulting from aquatic concrete exposure results in acute deleterious effects on fish gills, eyes, and reproduction (U.S. EPA 2012). In a toxicity study exposing salmonids (rainbow trout, *O. mykiss*) to water mixed with differing concentrations, highly alkaline conditions (pH > 10.5) caused fish to die within 20-30 minutes of exposure. When pH conditions were less alkaline (pH > 9) 60% of salmonids died within the 24-hour test period (McLeay & Associates 1983). Any spills, runoff, or seepage of wet concrete, concrete washout, and unmixed concrete into Johnson Creek will immediately cause unfavorable pH conditions where fish are present, resulting in acute toxic effects.

In addition to the risks associated with wet concrete, dry concrete dust also poses a risk to the surrounding vegetation. Dry concrete dust can be mobilized through the air during mixing, concrete cutting following curing, and disturbance of dried concrete in washout locations. In a recent study, Shah et al (2020) detailed decreased photosynthesis accompanied with increased oxidative stress, and an overall decrease in leaf and bud health. Vegetation within the riparian area of Johnson Creek and surrounding crops on adjacent farms are at the greatest risk. Damage to the riparian vegetation directly affects stream shading and the organisms present within the riparian vegetation, such as sensitive amphibian species known to have dense breeding populations in the upper Johnson Creek watershed, such as the Northern red-legged frog, Cascades frog (Figure 7), and other sensitive amphibian species such as long-toed, northwestern, and Columbia salamanders (Adolfson Assoc. 2000).

Complex Organic Pollutants

Polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) are organic pollutants identified as priority pollutants of Johnson Creek and covered in the 303(d) listing. These chemicals were placed on the 303(d) list as they exceed state standards for chronic toxicity which was 1,000 times beyond the state criterion (McCarthy and Gale 1999). Although PCBs may be present in some construction and building materials, the likelihood of significant PCB contamination is low due to the cessation of PCB manufacturing in the United States. However, sources of PAHs are anticipated to be abundant during and following construction, as they are present in hydraulic fuel, vehicular and mechanical oils and lubricants, and solvents. Given the quantity of vehicles and machinery to be present on site, particularly during construction, accidental spills and runoff are expected. Such incidents pose a toxicological risk to the aquatic species within Johnson Creek and the organisms within the riparian area. PAHs are lethal to freshwater invertebrates (*as recently reviewed by* Jesus et al 2022) and cause a variety of acute and chronic toxic effects on fish (DiGiulio and Hinton 2008), amphibians (Sparling 2010), and freshwater mussels (Ortiz-Zarragoitia and Cajaraville 2005; Figure 8). Specifically in salmonids, it is well established that PAHs cause tumorigenesis and carcinogenesis (e.g. Fong et al 1993), increased stress response (e.g. Hontela et al 1992), and endocrine disruption and impaired reproduction (e.g. Kennedy and Smyth 2015). In addition to fish and wildlife, PAHs also pose a risk to the riparian vegetation through runoff events. Depending on the water solubility of the PAH compound, aquatic and terrestrial plants uptake PAHs through their root system causing direct mortality. Low PAH concentrations can bioaccumulate and affect foraging wildlife.

Lessening organic pollutant load, such as PAHs, is one means to improve existing water quality conditions in the Johnson Creek watershed. The construction and operation of the proposed project is inconsistent with the state goals to improve this waterway, as it is likely PAHs will enter into Johnson Creek headwaters and add to an already impaired stream.

Figure 7. Northern red-legged tree frog, *Rana aurora* (left), and Cascades frog, *Rana cascadae* (right), in the Upper Johnson Creek riparian area at the southern border of the proposed development site (approx. 45°27'40.7"N 122°18'00.8"W). Photos taken August 22, 2023.

Figure 8. Western pearlshell mussel, *Margaritifera falcata.* Photo taken August 23, 2023, approximately 1 mile downstream of proposed project site (approx. 45°27'34.8"N 122°19'26.8"W).

Fisheries Impacts

PWB proposes to build their filtration plant at the headwaters of Johnson Creek, a tributary to the Willamette River (Figure 1). The subject property is so close to the creek that it includes a portion of the riparian corridor. Though much of the stream transits through urban areas, Johnson Creek continues to support natural production of migratory and resident salmonids including Chinook Salmon, Coho Salmon, Steelhead Trout, and Cutthroat Trout (Figure 9). Rainbow Trout are also present, but they have typically been classified as Steelhead, the anadromous (ocean-going) form of Rainbow Trout, due to spatial overlap between the two life-history types. All salmonids are protected by Oregon law as game fish and the anadromous species also receive federal protections under the U.S. Endangered Species Act (ESA). Chinook Salmon, Coho Salmon, and Steelhead Trout in Johnson Creek exist within the Lower Columbia River Evolutionary Significant Unit, listed as "threatened." This highlights the importance of fisheries resources in the creek and fragility of these populations. Only a handful of adult spawning salmon and their redds[9] are observed annually. Indeed, habitat restoration is ongoing with the aim of rebuilding fish runs in Johnson Creek, which once supported approximately 5,000 adult spawning salmon annually (JCWC 2023). The Oregon Department of Fish and Wildlife (ODFW) concluded that "persistence of native species, especially those most sensitive to habitat degradation, confirms the potential benefits of habitat protection and restoration" in Johnson Creek and other urban waterways in the Portland area (ODFW 2003).

The full extent of salmon and Steelhead distribution in Johnson Creek is unknown because survey crews are unable to reach some sections of stream on private property. ODFW does not perform comprehensive surveys and much of the data is collected by volunteers coordinated by the Johnson Creek Watershed Council (JCWC). However, available survey data indicate that Coho Salmon occur at least as far upstream as 307th Avenue, which is approximately two miles downstream of the proposed development site, and the upstream extent of Steelhead distribution is approximately one mile downstream of the site (Figure 9). Chinook Salmon are believed to utilize the lower five miles of the creek, and Cutthroat Trout occur throughout the drainage, including stream segments adjacent to the proposed project site. Cottrell CPO confirmed the stream directly adjacent to the proposed filtration plant is fish-bearing, has dense riparian vegetation, and good water quality suitable for native fishes (Figure 10). ODFW (2003) also report that headwater sites in Johnson Creek had the highest Indices of Biological Integrity relative to downstream survey sites (ODFW 2003).

Salmon and trout adjacent to, and/or downstream, of the proposed development property will be impacted by sedimentation, toxic runoff, temperature increases, and increased flashy flows[10]. These impacts are certain to occur if the project is allowed to proceed, as documented in PWB's

[9] *Redds* are salmon nests. The female salmon digs a depression in the gravel substrate with her tail, lays her eggs, and buries the eggs with gravel, leaving behind a circular-shaped mound of clean gravel visible to surveyors.
[10] *Flashy flows* are characterized by rapid increases in flow shortly after onset of a precipitation event, typically resulting in higher peak flows, high velocities, and substrate scour.

application materials, but the magnitude of effect depends on numerous variables. If the cumulative impact of all these factors is significant, severely depressed salmon and trout populations in the creek may be completely extirpated, or their distribution could be further constrained. However, even a small impact from the proposed facility fails Conditional Use Criteria MCC 39.7515(B), which does not allow any adverse effects from non-agricultural industries. PWB contends that implementation of BMPs and mitigation measures will reduce impacts to allowed levels defined by DEQ. However, we remind the Hearings Officer that compliance with DEQ's general National Pollution Discharge Elimination System (NPDES) pollution control standards during construction of an industrial project is not sufficient to satisfy Conditional Use Criteria MCC 39.7515(B) within MUA-20, which is far more restrictive. Moreover, the general NPDES permit submitted by PWB to Multnomah County is not project-specific, and it was deceptive for PWB to represent it as such. Our correspondence with DEQ confirmed that pollution control plans still need to be developed by PWB and submitted to DEQ for approval (Attachment B).

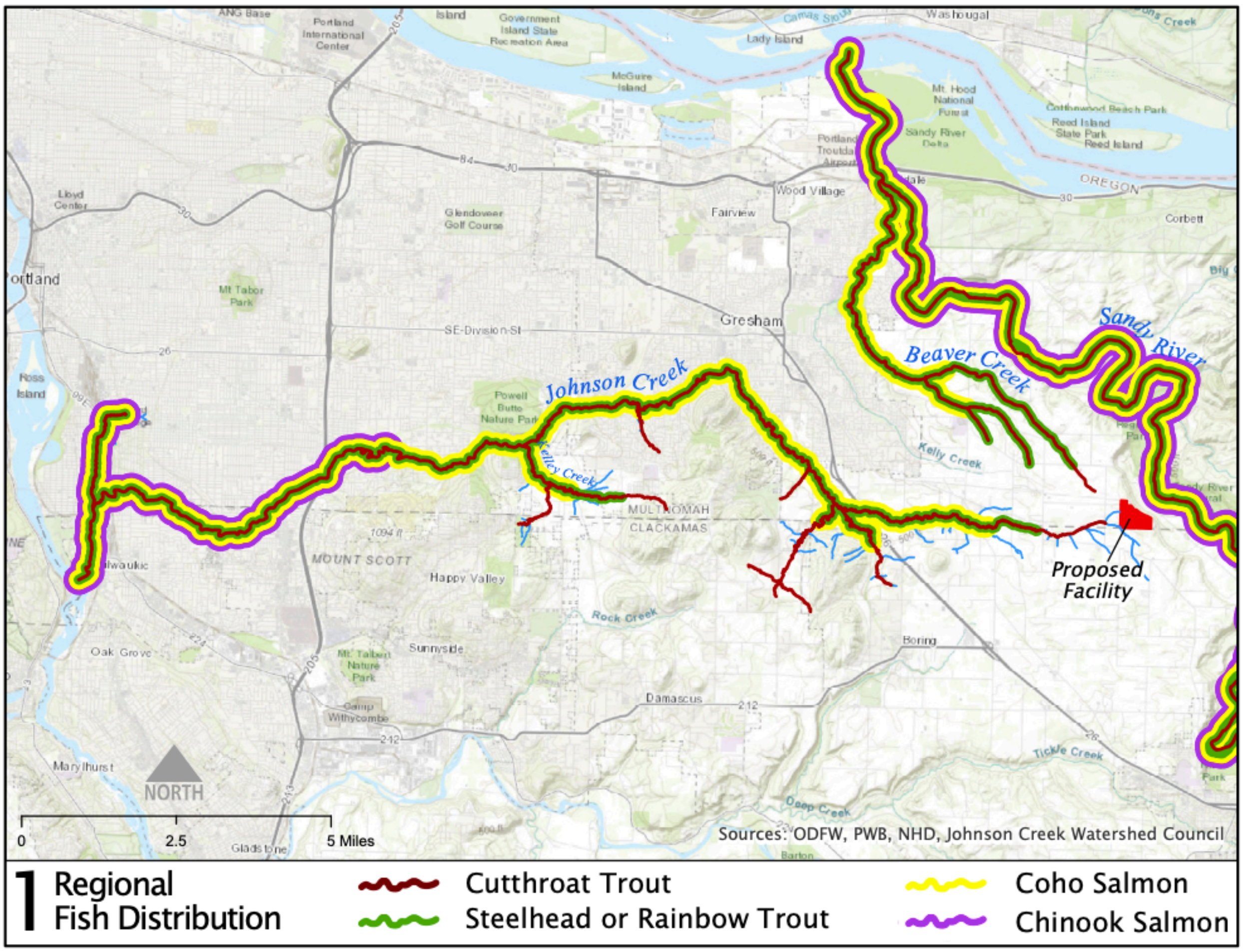

Figure 9. Salmon and trout distribution within Johnson Creek, Beaver Creek, and the Sandy River adjacent to the proposed filtration facility and associated pipelines.

Figure 10. Pictures from a stream survey conducted on August 22, 2023 in Johnson Creek directly adjacent to PWB's proposed development site at Carpenter Lane. (left) Snorkel survey to confirm fish presence. (center) Water quality measurements indicating suitable dissolved oxygen (>8 mg/L) and summer temperature (<18 °C) conditions for native cold-water fish species. Measurements taken at 17:00 PDT when stream temperature was at its daily peak. (right) Dense riparian vegetation surrounding the creek.

Fine Sediment Inputs

Construction and operation of the proposed filtration plant will increase fine sediment loads in Johnson Creek from its headwaters to its confluence with the Willamette River. Fine sediment has a variety impacts on salmonids. For example, fines can smother and bury gravel beds, which are crucial for salmon spawning. When sediment fills the spaces between course gravel substrate, it impairs the ability of salmon and trout to dig their redds and deposit their eggs. This can significantly reduce successful spawning and egg-to-fry survival (Jensen et al. 2009). Fine sediment can also reduce water clarity and block sunlight penetration, negatively affecting aquatic plant growth. When plants are unable to photosynthesize, dissolved oxygen levels in the water can decrease, leading to oxygen-deprived conditions (Parkhill and Gulliver 2002). Finally, fine sediment deposition can also alter both macro- and microhabitat features. Excessive fine sediment can reshape the stream channel, changing flow patterns, and filling in riffles and pools that are essential for salmon feeding and refuge (Paddy 1991). Turbid water also smothers microhabitats where invertebrates live, such as within the interstitial spaces between gravel and cobbles, leading to a decline in abundance and diversity of benthic invertebrates and limiting the availability of prey for rearing salmon and trout (Cover et al. 2008).

Toxic Runoff

PWB is proposing roughly 50-acres of impervious surface within their filtration plant and administrative building complex. This includes both asphalt and concrete surfaces. The local area does not have stormwater runoff conveyance, nor stormwater treatment facilities. Therefore, most of the runoff from the proposed facility will flow into Johnson Creek, carrying with it numerous toxins. Contamination of waterways due to the discharge of pollutants has significant negative effects on salmon and trout populations. Salmonids are highly sensitive to changes in water quality, and the presence of toxic substances in their habitat can lead to a variety of detrimental impacts. Specifically, pollutants like heavy metals, pesticides, industrial chemicals, and petroleum products can disrupt salmonid physiological processes, cause organ damage, reduce feeding activity, alter migratory patterns, reduced predator avoidance, impair reproduction, and cause death (DiGiulio and Hinton 2008). Researchers in Washington recently discovered that chemicals deposited on roadways from tires cause widespread prespawning mortality in Coho Salmon following fall freshets (Tian et al. 2021), offering a contemporary example of how devastating toxic runoff from the proposed filtration plant could be for struggling salmon populations in Johnson Creek.

Temperature Increases

Temperature can influence the abundance of salmonids because it changes physiological demands on fish (Li et al. 1994; Ebersole et al. 2003). Higher temperatures require higher rates of respiration and additional food consumption (Brett 1971). Above certain critical thresholds, temperatures become lethal, and salmonids exhibit avoidance behavior (Brett 1952). Oregon has established temperature water quality standards for the Lower Columbia River to protect migrating salmon and steelhead, which include a 20°C numeric criterion for limiting maximum water temperatures (EPA 2021). Salmon and trout typically prefer water temperatures between 14 and 18 ^{o}C for optimum growth and survival. At approximately 18 ^{o}C, most salmonids seek thermal refugia (e.g. Brett 1971).

The headwaters of Johnson Creek currently has water temperatures suitable for salmonids[11], but even a small increase of less than 1 ^{o}C will push summer temperatures above 18 ^{o}C, impacting growth and survival of salmon and trout. Large paved surfaces, such as the one proposed at the headwaters of Johnson Creek, are known to cause thermal pollution, degrading stream habitat and harming coldwater fish species (Herb 2008). Moreover, PWB plans to hold stormwater in detention ponds prior to release into Johnson Creek. These ponds will increase the transfer of solar energy, heating up the water in the spring and summer prior to its release into the creek. In addition, turbidity from runoff at the site will raise water temperature because suspended particles absorb the sun's heat.

Flashy Flows

Flashy flows refer to rapid and unpredictable changes in water flow within rivers and streams. These changes are often caused by urbanization, deforestation, and changes in land use that alter the natural hydrological cycle. Impervious surfaces like asphalt and concrete increase ramping rates in streams following rain events. JCWC is working with Depave, another local non-profit, to reduce the amount of impervious pavement within the watershed. 50-acres of new impervious surface at the headwaters of Johnson Creek conflicts with this initiative. PWB proposes to collect

[11] Water temperature was 17.2 ^{o}C in Johnson Creek adjacent to PWB's proposed development site on August 22, 2023 at 17:00 PDT.

stormwater in retention ponds, but this measure is only relevant to summer and fall seasons. Winter and spring storms in the area will be far too large to contain runoff from a facility as large as the one proposed and PWB will be forced to discharge directly into the creek. A clear example of this problem occurred in December 2022 when PWB's contractors excavated a large area at the proposed development site. The excavated hole quickly filled with water and silt-laden overflow began running into Johnson Creek within days of the dig despite use of BMPs to retain the water and silt (Figures 3 and 4). Moreover, PWB claims runoff from the site will be restored to pre-project conditions, but no measurements or quantification of existing stormwater runoff conditions are provided in their Conditional Use application materials.

Altered flow regimes have numerous negative impacts on fish and aquatic ecosystems (Sofi et al. 2020). Fish in Johnson Creek are adapted to a specific flow pattern that provide suitable conditions for spawning and rearing. Flashy flows scour course gravel and cobble substrate, dislodge instream wood, erode the stream banks, and simplify habitats, making it difficult for fish to find suitable areas for spawning, rearing, and refuge. Salmon and trout also rely on specific water velocity and depth conditions for successful reproduction. Sudden high flows can scour fish eggs and disrupt the development of young fish by eroding nesting sites and changing the distribution of important substrate materials. Sudden changes in flow can also wash away insects and other aquatic invertebrates that are an essential food source for rearing salmonids. Many fish species undertake seasonal migrations for feeding, breeding, or avoiding adverse conditions. Flashy flows can impede these migrations by creating barriers, disrupting navigational cues, and causing physical injuries.

Failure to Comply with Federal Natural Resource Protection Laws

Public and private organizations are required to consult with the National Marine Fisheries Service (NMFS) when they engage in activities that may harm, harass, or kill threatened or endangered anadromous fish species. This consultation process includes a biological effects analysis and specification of actions that will be taken to minimize effects. If the proposed action is determined to potentially jeopardize the continued existence of the species, NMFS has authority to prohibit the action from occurring.

To our knowledge, PWB has not consulted with NMFS about their proposed filtration plant and administrative building complex near Johnson Creek. Perhaps they were unaware of ESA-listed salmon and steelhead presence in Johnson Creek, or perhaps they did not consider the influence of construction and operation of the filtration plant on water quality in the creek, but it's difficult to infer ignorance in this case. PWB has full-time fish biologists on-staff, and they have been operating in the Sandy River basin for decades. PWB also has a Habitat Conservation Plan (HCP) in place to address impacts of their Bull Run Projects on ESA-listed salmon and steelhead, so they are familiar with the ESA consultation process. Having reviewed PWB's Bull Run Project HCP and the accompanying Biological Opinion (BiOp) authored by NMFS, we noted that the proposed filtration plant at Carpenter Lane is not addressed in the BiOp and is outside the scope of the Bull Run HCP. Therefore, PWB is not permitted to harm, harass, or kill steelhead and salmon in Johnson Creek as a result of building a filtration plant at the Creek's headwaters. Proceeding with construction of the filtration plant without first consulting with NMFS and receiving coverage for *taking* a listed species would be a violation of the ESA. The EPA will need to be involved in the consultation with NMFS as well because the project received funding from the Water Infrastructure Finance and Innovation Act (WIFIA) administered by the EPA, making it a federal action. This creates a paradox for PWB, and the land use process in general, because an ESA consultation will result in assessment and description of fisheries impacts, revealing that PWB's proposal does not meet Conditional Use Criteria MCC 39.7515(B). Applying for a Conditional Use permit from Multnomah County prior to completing an HCP and Biological Assessment for their proposed action is incongruous because the ESA consultation process is critical to the land use decision. Why would Multnomah County consider approving a project that will result in *taking* ESA-listed fish, particularly when the extent of *take* has not been assessed by the regulatory agencies?

We have serious concerns about PWB's integrity with respect to adherence to environmental protection policies relevant to their proposed project. When applying for funding from the EPA's WIFIA program, PWB did not submit accurate information. Cottrell CPO and the Pleasant Home Neighborhood Association met with WIFIA program staff on February 18, 2021 and followed that meeting with a letter to the EPA expressing our concerns (Attachment A). In summary, key information within PWB's application packet was either inaccurate or incomplete with respect to socioeconomic and environmental impacts of the proposed filtration project. For example, Coho Salmon, Chinook Salmon, and Steelhead Trout were not listed among the species that could be affected by the project. These omissions caused EPA to erroneously conclude that PWB's proposal would have "no significant impact." An Environmental Impact Statement (EIS) was not required for the project because, according to the application materials provided by PWB and their contractors, the proposed project met the parameters defined in WIFIA's Programmatic Environmental Assessment (PEA). In our opinion, this oversight or slight-of-hand remains an outstanding legal problem for the filtration plant proposal and its funding source. It also provides a vivid example of PWB's attempt to subvert the environmental assessment process and fast-track construction of the filtration plant. Finally, it should be noted that a draft Finding of No Significant Impact (FONSI) was published in the federal register for the WIFIA program, but a final FONSI has not been published, suggesting that the WIFIA program itself may be operating in violation of the National Environmental Policy Act (NEPA).

Detailed Rebuttal of Select Materials Submitted to Multnomah County by PWB

In addition to the general rebuttal materials offered above, the following subsections address select components of PWB's application materials related to impacts of the proposed project on water quality and fisheries resources.

Response to Exhibit I.95: Memorandum from Todd Alsbury, Altap Restoration

PWB submitted an "expert opinion" in the form of a memorandum from a biologist who is familiar with fish species assemblage and distribution in Johnson Creek (Exhibit I.95). Mr. Alsbury's memo dismisses impacts to fish and water quality without providing any objective analysis. PWB's willingness to rely on the subjective opinion of its paid contractors in an attempt to circumvent the land use permitting process is a major concern. Mr. Alsbury is not an expert on industrial construction projects nor BMPs of the type proposed. Therefore, it is not scientifically credible for him to offer his assurance that the proposed project will not impact Johnson Creek and Beaver Creek, particularly without providing any data or analysis. It also appears that Mr. Alsbury is not the author of significant portions of his memo, which closely resemble other materials authored by PWB. Not surprisingly, these sections are those relating to PWB's proposed BMPs for construction and operations.

Mr. Alsbury's memorandum begins with a relatively accurate description of fish distribution in Johnson Creek and acknowledgement of the legitimate public concerns expressed during the land use hearing on June 30, 2023 regarding impacts to water quality and fish in Johnson Creek. The memo then goes on to explain that PWB has considered <u>all</u> potential impacts to Johnson Creek and neighboring Beaver Creek, and inclusion of BMPs will mitigate these potential impacts. It is disingenuous for PWB and Mr. Alsbury to suggest that <u>all potential impacts have been considered</u> when no information was provided in the application materials related to Pacific salmon and trout until after fisheries concerns were raised during the land use hearing. Coho Salmon, Chinook Salmon, and Steelhead Trout are keystone species in Oregon, protected by state and federal laws. How could this be overlooked within PWB's land use application and WIFIA loan application materials if <u>all</u> impacts were considered? This calls into question the rigor with which PWB is willing to address their impacts on natural resources, and suggests they are attempting to conceal those impacts from decision makers.

Mr. Alsbury's perspective relies on an important logical error. Paragraph three on page one of his memo begins with a statement about impacts to the upper reaches of Johnson Creek from agriculture and urban development. The last paragraph of his memo includes a related statement about "existing conditions." Agriculture and low-density residential housing are allowed uses within MUA-20 and EFU zonings. These uses are inherently afforded a modest impact on waterways and other natural resources in the area. An industrial water filtration plant is not an allowed use, which is why it must meet strict conditions to receive permit approval. Furthermore, the fact that Johnson Creek and Beaver Creek have been impacted by existing land uses and development is not a good rationale for approving additional impacts. If so, this type of logic could be used to justify increasingly more impactful development around all urban waterways. In fact, the reverse is true. Natural resource protection laws most often become more restrictive in cases where impairment has already occurred (e.g. The Clean Water Act 303(d) listing). Finally, Mr. Alsbury's interpretation of Conditional Use Criteria MCC 39.7515(B) is incorrect. The standard for satisfying Conditional Use Criteria MCC 39.7515(B) is no adverse effect. Like other materials submitted by PWB, Mr. Alsbury's memo incorrectly assumes the goal is to minimize or mitigate for effects. Moreover, Mr. Alsbury's claim that PWB's project will improve conditions in Johnson and Beaver Creeks relative to baseline conditions is at best, speculative and at worst, disingenuous spin.

Response to Exhibit I.96: Letter from Sarah Hartung, ESA

Ms. Sarah Hartung, Senior Ecologist with Environmental Science Associates was contracted by the Portland Water Bureau to provide comment on potential wildlife habitat impacts of the proposed water filtration project. In Exhibit I.96, Ms. Hartung offers rebuttal to public testimony and measures for avoidance and mitigation regarding a few topics. Here we will address her submittal on the (1) communication tower, and (2) general wildlife and Oregon Conservation Strategy.

1. Communication Tower:

   The applicant does not refute that communication towers and guy wires in general can pose risks to night-migrating birds; however, no site-specific evaluation or study of the effects of the proposed communication tower on night-migrating birds (including sparrows and other songbirds) is needed because the design of the tower incorporates key avoidance and minimization measures recommended by U.S. Fish and Wildlife Service (USFWS). [pg.7]

   The following features of the proposed tower and site features for the Project will minimize the risk of bird collisions including.. [pg.7]

   Response: In Ms. Hartung's responses above, PWB acknowledges that the project will have adverse effects to night migrating birds and that impacts will be minimized by adhering to USFWS recommendations. Minimizing effects is not the same as no adverse effects as required by MCC39.7515(B). These statements are

   The tower will not have a solid light which would attract birds at night and cause collisions. [pg. 7]

   Response: It is correct that solid lights on towers attract birds leading to collisions and death. However, according to USFWS, blinking or flashing lights reduce such incidences. Again, the MCC39.7515(B) explicitly states "no adverse effects on natural resources," not a reduction or minimization of adverse effects. Incidental take on one bird is an adverse effect to the population.

The tower will be 180 feet high, substantially lower than the altitudes of night-migrating birds (Ehrlich et al 1988). [pg.7]

Response: It appears that Ms. Hartung made a general statement regarding all night-migrating birds, and did not specify the altitude range of the night-migrating birds that specifically utilize the area, and not just the chipping sparrow. Also, "substantially lower" needs to be defined as it relates to the altitude ranges to establish that no night-migrating bird will be affected by the tower. Last, 180 feet high is tall relative to surrounding trees and the existing Pleasant Home Water District water towers.

The project site and vicinity are not within an area known for especially inclement weather. [pg.7]

Response: It is unclear how "especially inclement" is defined and how it relates to bird collisions, as Ms. Hartung does not elaborate. However, inclement weather in one source, is defined as[12]: the existence of rain or abnormal climatic conditions (whether they be those of hail, snow, cold, high wind, severe dust storm, extreme high temperature or the like or any combination thereof) by virtue of which it is either not reasonable or not safe for workmen exposed thereto to continue working whilst the same prevail. The rural area where the filtration facility is proposed receives strong winds in the fall, winter, and spring often causing fallen trees and long-lasting power outages. In addition, due to the east winds coupled with heavy rains during the winter, the icing of roads is a common occurrence with many local area school closures annually. Also, due to the proximity to the Sandy River canyon, the rural area is often inundated with extremely heavy fog, making visibility difficult.

The proposed tower will be 150-200 horizontal feet from the top of the slope of the forested hillslope west of the Sandy River; but its position at the site is not expected to negatively affect birds because of the relatively short stature of the tower and the fact that it will not have guy wires nor a solid light.[pg.7]

Response: The communication tower is currently designed to be 180 feet high. This "relatively short stature" of a tower is taller than the average of heights of Douglas Fir (100-120 ft)[13] and Western Red Cedar (120-150 ft)[14], both of which surround PWB's property. The height of the tower is within the altitude range of normal movement for a variety of resident bird species, including owls and other birds of prey. Such resident

[12] https://www.lawinsider.com/dictionary/inclement-weather
[13] https://www.srs.fs.usda.gov/pubs/misc/ag_654/volume_1/pseudotsuga/menziesii.htm
[14] http://nativeplantspnw.com/western-red-cedar-thuja-plicata/

birds include, Great Horned Owl, Barn Owl, Western Screech Owl, Bald Eagle, and Red-Tailed Hawk, all of which fly at ground level to about 200 ft when hunting. In the chosen location for the communication tower, residents and nursery workers regularly (daily) observe these species in the surrounding trees. Red-tailed hawks in particular regularly perch in those trees at the proposed communication tower location to hunt the fields surrounding the Pleasant Home Water District towers.

Ms. Hartung's assertion that it is "not expected to negatively affect birds" is not supported by any empirical, ground-truthed data. She assumes no effect due to its location relative to the forested hillslope west of the Sandy River.

2. General Wildlife and Oregon Conservation Strategy.

Figures 1 and 2 provided in Exhibit E.17 are misleading as the data from ODFW are derived from large landscape mapping efforts that require site-specific evaluation and are not intended to indicate confirmed presence for a particular parcel. [pg.8]

Response: We agree that the OCS mapping tool provides general species population and habitat information, and that site-specific evaluation is needed. PWB has not completed an on-the-ground, site-specific evaluation for fish, wildlife, or vegetation for any of the water-resource or wildlife corridors. Given that Statewide Goal 5 – Natural Resources, Scenic and Historic Areas, and Opens Spaces of Oregon is adopted to manage and protect the state's natural resources, and Multnomah County's Conditional Use Criteria MCC39.7515(B) to protect natural resources, it is undoubtedly the responsibility of the Portland Water Bureau to inventory these areas. Any claims of "no effect" or "no adverse effects" is meaningless if the effect they are measuring or modeling cannot be compared.

Figure 1, which shows purple areas of crucial habitat overlapping with the planned filtration site, does not reflect current mapping of the northern spotted owl nor the Columbia white-tailed deer. The nearest critical habitat designation for the northern spotted owl, under the jurisdiction of the U.S. Fish and Wildlife Service and which requires relatively large tracts of mature and old-growth forest, is located in the Mount Hood National Forest more than 10 miles west of the Project area.

Response: The mapping is current for crucial habitat under the Oregon Conservation Strategy (OCS). Crucial habitat is designated by Oregon, consisting of habitat features within specific ecoregions of the state for the purpose of protecting approximately 300 "species of greatest conservation need[15]." These species may or may not be listed as threatened or endangered under the federal Endangered Species Act. In Ms. Hartung's rebuttal, she compares crucial habitat with critical habitat. USFWS defines critical habitat

[15] https://oregonconservationstrategy.org/

as habitat essential to the conservation of listed species. While it is true that critical habitat for both the northern spotted owl and Columbia white-tailed deer is located over ten miles away, it does not negate the importance of the habitat designated as “crucial” by Oregon. Furthermore, non-critical habitat does not equate to absence of the species.

No rare or state or federally threatened or endangered wildlife species are known to occur on or adjacent to the Project. [pg. 8]

Response: Two biodiversity reports generated on September 5, 2023 from the Oregon Biodiversity Center for the southeast (Johnson Creek) and the northwest portions of the property. The reports resulted in several listings under the state and federal status (full report provided in Appendix D):

Common Name	Property Location	State Status	Federal Status
Western pond turtle	SE, NW	SC	SOC
Painted turtle	SE, NW	SC	
Willow flycatcher	SE, NW		PS
Little brown myotis	SE, NW		UR
Coho Salmon	SE	LE	T
Steelhead	SE	SC	T
Olive-sided flycatcher	SE, NW	SC	
Townsend’s big-eared bat	SE	SC	
Yellow-breasted chat	NW	SC	
Purple martin	NW	SC	
Cascade torrent salamander	NW		UR
Sharp-shinned hawk	NW		PS
Red tree vole	NW		PS, C
Oregon slender salamander	NW		SOC
Larch mountain salamander	NW	SC	SOC

SOC – species of concern
PS – partial status
UR – under review
T – threatened
LE – listed as endangered
SC – sensitive, critical
C – candidate for listing as threatened or endangered

In addition to the state and federal status for the species outlined above, over 30 species are ranked as at least “rare, threatened or uncommon throughout its range” by USFWS or NMFS and ranked by the state of Oregon as “rare, threatened or uncommon in Oregon,” see G and S rankings in Appendix D (highlighted in yellow).

Medium and larger mammals that may be using the filtration site as a movement corridor are expected to be found along the edge of or just within the forest along the hillslope which would provide cover from human activity.
Response: This is not true. Any query with the neighbors that are adjacent to the property will attest to regular and frequent cougar, bobcat, black bear, and coyote sightings on the proposed filtration site. Currently, there are many scat droppings of bear and coyote throughout the former nursery roads that traverse the property, not limited to the perimeter or the forest along the hillslope.

Once constructed, the PWB facility will be quiet with little activity and will be buffered by native vegetation that is anticipated to improve habitat values over the current conditions by increasing species diversity which increases cover/shelter and foraging habitat functions at the site.

Response: Describing a fully operational, fully staffed 50-acre industrial water treatment facility pumping upwards of 165 million gallons per day as “quiet with little activity” is preposterous. Ms. Hartung has sourced this information directly from her client’s description and has little expertise in the activities associated with normal operations of such an industrial facility. Native vegetation may certainly reduce the sound of the facility, but it does not quiet the constant unnatural sounds emitted twenty-four hours per day, seven days a week, three hundred sixty five days per year, indefinitely. Existing conditions consist only of natural sounds with the occasional tractor or intermittent traffic occurrences. Essentially no anthropogenic sounds are heard at night aside from the occasional car down Dodge Park Blvd or Bluff Rd. Most sounds are of the owls calling, coyotes barking, and bats flitting around. Lighting proposed for the facility will disturb the current night sky. To suppose that planting new shrubs around very large industrial facility will increase species diversity is very presumptuous.

Conclusion

Adverse impacts of PWB's proposed filtration plant and administrative building complex on water quality and fisheries resources in Johnson Creek are indisputable. The proposed industrial project is extremely large, will be very close to the headwaters of Johnson Creek and other waterways, requires a large area of impervious surface, and will discharge warm, turbid, and toxic water into the creek. No empirical data or analytical framework has been provided by PWB to formally evaluate any of these impacts. Instead, PWB's land use application materials acknowledge these impacts are going to occur (Attachment C). Mitigation measures are offered and use of BMPs are pledged to attempt to reduce the effects.

We urge the hearings officer to deny PWB's application for a Conditional Use permit for a filtration plant and administrative building complex at Carpenter Lane in East Multnomah County. Project proponents have not proven they can satisfy Conditional Use Criteria MCC 39.7515(B): *Will not adversely affect natural resources*. Upon review of these issues, we conclude that PWB's project will have significant impacts on Johnson Creek water quality and fisheries resources.

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Attachment A: Letter to EPA Office of Wastewater Management

Cottrell CPO

PO Box 744
Boring, OR 97009
503-421-8459
CottrellCPO@gmail.com

To: Andrew Sawyers
Director, Office of Wastewater Management
sawyers.andrew@epa.gov
202-564-0748

3/16/21

Dear Mr. Sawyers,

We are writing to inform you that the EPA's recent award of a $726.6 million loan to the Portland Water Bureau does not conform with the WIFIA program's Programmatic Environmental Assessment. The scale of impacts caused by this project warrant preparation of an EIS, as well as revisions to the Portland Water Bureau's Habitat Conservation Plan for operations of the Bull Run Project.

We reviewed the Portland Water Bureau's loan application materials and we talked with EPA staff in the WIFIA program about our concerns. The funding applicant provided fraudulent information about the project's impacts on farmland and ESA-listed species, which led to a "no significant impact" determination by the WIFIA program. WIFIA program staff explained during our meeting with them on February 18, 2021 that the application "questionnaire" was not a critical factor because funding was available for all applications and credit score was therefore the only evaluation criteria considered during loan application review. We believe that was inappropriate and sidestepped requirements for a thorough NEPA process.

Due to the scope and scale of environmental and socioeconomic impacts caused by Portland Water Bureau's proposed project, we believe an EIS should have been written before determining whether this project could receive federal funding. For example, the proposed project is at the headwaters of Johnson Creek. Johnson Creek has ESA-listed Coho Salmon and Steelhead Trout. WIFIA program staff and funding applicants at the City of Portland did not contact appropriate staff at NOAA Fisheries during the funding application process. Therefore, the information used to support a "no significant impact" determination was incomplete. Furthermore, the farmland conversion rating analysis completed by the City of Portland and approved by the EPA was erroneous. Taken together, the incomplete environmental assessment and inaccurate farmland impact evaluation led to the conclusion that Portland Water Bureau's project conformed with the WIFIA program's PEA. This must be corrected to avoid irreparable harm to our rural community and the environment.

Please respond to this inquiry no later than Monday, March 22, 2021.

Respectfully,

Ian Courter
Cottrell Community Planning Organization
503-421-8459
cottrellCPO@gmail.com

Cc: Alejandro Escobar; Kate Wells; Jeff Merkley; Ron Widen; Anna Williams; Chuck Thompson; Shirley Craddick; Alexis Taylor; Carol Johnson; Lori Stegman, Mark Shull

Attachment B: Oregon DEQ Correspondence RE: 1200CA

1200CA, Permit# NGEN12CA-ORRCA0004 Inbox ×

BENNINGHOFF Benjamin * DEQ <Benjamin.BENNINGHOFF@deq.oregon.gov> Fri, Aug 25, 8:38 AM (10 days ago)
to me, WIGAL, SEVEN, EDWARDS

Good Morning, Lauren-

Thank you for your inquiry and questions related to coverage of the Bull Run Water Filtration Project under the 1200-CA construction stormwater permit. I am the new Stormwater and Underground Injection Control manager with DEQ, and working with DEQ stormwater program staff, have included responses to your questions in text (blue, bolded) below.

- Is this permit specific to the proposed Bull Run filtration project? **No. Portland Water Bureau (PWB) can apply 1200-CA permit coverage to any PWB Capital Improvement project.**

- Has the Portland Water Bureau received approval from DEQ for the filtration facility and pipeline Environmental Management Plans? **No, DEQ has reviewed the plans and requested revisions prior to approval. DEQ has not yet received revised plans.**

- Has the Portland Water Bureau submitted their Erosion and Sediment Control plans to DEQ? **Yes. The erosion and sediment control plan was submitted, but upon review by DEQ staff, DEQ requested revisions prior to approval. DEQ has not yet received revised plans.**

- I am unfamiliar with the 1200CA and 1200C permitting process so any insight would be greatly appreciated. **Registrants of the 1200-CA permit are Public Entities performing Capital Improvement projects. I have included a link to the DEQ website for the 1200-C Construction Stormwater Series Permits for Government Agencies (https://www.oregon.gov/deq/wq/wqpermits/Pages/1200seriesGov.aspx). You may want to look at the 1200-CA Permit tab and the Final 1200-CA evaluation report on the website, which provides additional background and information regarding the 1200-CA permit. If you still would like additional clarity upon reviewing this information, please contact me, and we can set up a time to discuss further.**

Please do not hesitate to contact me if you have any other questions.

Sincerely,

Ben

Benjamin Benninghoff | Stormwater UIC Manager
Oregon Department of Environmental Quality
Northwest Region Water Quality
700 NE Multnomah St. Ste. 600, Portland, OR 97232
Cell: 971-349-8987
Benjamin.benninghoff@deq.oregon.gov

Attachment C: PWB's Admission of Adverse Effects

The Portland Water Bureau (PWB) and its consultants and legal team have acknowledged that the proposed filtration plant and associated pipelines will adversely affect natural resources, which does not comply with MCC39.7515(B), see Table below. For example, Exhibit I.96 from Environmental Science Associates (ESA) (dated August 4, 2023) describes mitigation measures related to "impacts to wildlife habitat where avoidance is not practicable." Therefore, PWB acknowledges that it cannot meet conditional use approval criteria MCC39.7515(B) since it will impact natural resources to some degree.

Definitions: Mitigation is defined as the action of reducing the severity, seriousness, or painfulness of something No significant impact: there is a *measurable difference* between the groups and that, statistically, the probability of obtaining that difference by chance is very small (usually less than 5%) Best Management Practices (BMPs): a practice or combination of practices that is an effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources. Maximum Extent Possible: as the maximum achievable volume control, using all known, available and reasonable methods, given the site restriction

Below are citations where adverse effects are acknowledged (italics and bold included to emphasize):

Project Component	**Impacted Natural Resource**	**Statement**	**Author**	**Exhibit**	**Page**
Communication Tower	Migrating birds	"…in general can ***pose risks*** to night migrating birds." "…design of the tower incorporates key avoidance and ***minimization*** measures..." "…features...will ***minimize the risk*** of bird collisions…"	ESA	I.96	7
Filtration Facility	General wildlife	"…several common wildlife species are either known or expected to occur on-site and the project vicinity…"	ESA	I.96	8
Filtration Facility	Water Quality	"The BMPs as designed ***mitigate potential impacts*** to instream habitat and fish…"	Altap Consulting	I.95	2
Pipeline	Water Quality	"Erosion control BMPs along the pipelines have been designed to ***minimize construction phase sediment load***."	Altap Consulting	I.95	3, 4
Filtration Facility	Hydrology	"…***minimizing hydromodification*** in accordance with Portland SWMM Section 1.3.5." "Water will be discharged in the SW corner…more than 200 ft from Johnson Creek."	Altap Consulting	I.95	4
Pipeline	Hydrology	"Energy dissipators are proposed to ***spread flows***, ***reduce release water velocity***, and avoid point discharge."	Altap Consulting	I.95	5
Filtration Facility	Fish, Aquatic Resources	"Construction, operation, and maintenance of the filtration facility in the Johnson Creek watershed is ***designed specifically to reduce potential impacts to the creek's fish and aquatic resources***…"	Altap Consulting	I.95	5
Filtration Facility	Water Quality	"Clearing and grading will be sequenced to prevent exposed inactive areas from becoming a source of erosion to the ***maximum extent possible***…"	Stantec	I.100	1
Filtration Facility	Water Quality	"…will be used to prevent or ***minimize stormwater exposure to pollutants*** from spills	Stantec	I.100	
Distribution Main	Wildlife	"***To minimize wildlife habitat impacts*** and tree removal, all construction activities will…"	Winterbrook	G.2	5, 7

		"Construction of the underground distribution main will result in ***no significant or long-term detrimental impacts*** to wildlife habitat functions."			
Filtration Facility	SEC-h, SEC-wr	"…because of these efforts, the project will have ***no significant impacts to habitat and water resources*** in the SEC overlays."	Winterbrook	A.11	4
Distribution Main	SEC-h	"However, the ***alignment must transit the SEC-h zone*** and therefore requires an SEC review."	Winterbrook	A.69	2
Distribution Main	SEC-h	"All temporary disturbance areas within the SEC-h zone will be ***revegetated***…"	Winterbrook	A.69	5

Attachment D: Results of Biodiversity Query from ORBIC

9/5/2023 2:24:10 PM

Biodiversity Report

45.4639°N, -122.2951°W

Location Information

Latitude:	45°27'50"N	Longitude:	-122°17'42"W
Latitutde (Decimal Minutes):	45°27.8333'N	Longitude (Decimal Minutes):	-122°17.7'W
Latitutde (Decimal Degrees):	45.4639°N	Longitude (Decimal Degrees):	-122.2951°W
USGS Quad:	Sandy, 45122-D3	Maidenhead Grid Square (ARRL):	CN85UL
Legal (Township Range Section):	Section 22 of Township S1, Range E4	County:	Multnomah County
Magnetic Declination:	Not Available		
Elevation:	Not Available	Avg Annual Precipitation:	58 in (inches)
Watershed (10 Digit HUC):	Lower Sandy River (1708000107)		
Sub-watershed (12 Digit HUC):	Trout Creek-Sandy River (170800010702)		
Fire Protection District:	N/A	ODF Regulated Use:	Not Available
Fire Weather Zone:	604	ODFW Wildlife Management Unit:	WILLAMETTE
Public Ownership:	Private -		

Animal Species (Aquatic Habitat Associated) in Sub-watershed Trout Creek-Sandy River (170800010702)

*** See Appendix for Status and Rank Code Lookup*

#	Common Name	Scientific Name	Relative Abundance Index	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Links
1	Western pond turtle	*Actinemys marmorata*	*1.48*	*G3*	*S2*		*SOC*	*SC*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
2	Western toad	*Anaxyrus boreas*	*1.13*	*G4*	*S4*			*S*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
3	Great blue heron	*Ardea herodias*	*1.2*	*G5*	*S4*	*Y*				View in Wildlife Viewer; View Habitat Map (pdf)
4	Coastal tailed frog	*Ascaphus truei*	*0.93*	*G4*	*S3*			*S*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
5	Bufflehead	*Bucephala albeola*	*1.19*	*G5*	*S2B,S5N*					View in Wildlife Viewer; View Habitat Map (pdf)
6	Green heron	*Butorides virescens*	*2.71*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)

Generated through the Oregon Explorer Biodiversity Map Viewer

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Biodiversity Report

45.4639°N, -122.2951°W

#	Common Name	Scientific Name	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
7	Vaux's swift	*Chaetura vauxi*	G5	S4B					0.85	View in Wildlife Viewer; View Habitat Map (pdf)
8	Painted turtle	*Chrysemys picta*	G5	S2			SC	Y	4.01	View in Wildlife Viewer; View Habitat Map (pdf)
9	Olive-sided flycatcher	*Contopus cooperi*	G4	S2S3B			SC/S	Y	0.88	View in Wildlife Viewer; View Habitat Map (pdf)
10	Cope's giant salamander	*Dicamptodon copei*	G3	S2?			S	Y	1.11	View in Wildlife Viewer; View Habitat Map (pdf)
11	Pacific giant salamander	*Dicamptodon tenebrosus*	G5	S4					0.99	View in Wildlife Viewer; View Habitat Map (pdf)
12	Willow flycatcher	*Empidonax traillii*	G5	S3B		PS		Y	0.93	View in Wildlife Viewer; View Habitat Map (pdf)
13	Big brown bat	*Eptesicus fuscus*	G5	S4					1.05	View in Wildlife Viewer; View Habitat Map (pdf)
14	Bald eagle	*Haliaeetus leucocephalus*	G5	S4B,S4N	Y	DL			0.95	View in Wildlife Viewer; View Habitat Map (pdf)
15	Harlequin duck	*Histrionicus histrionicus*	G4	S2B,S3N			S	Y	0.9	View in Wildlife Viewer; View Habitat Map (pdf)
16	Yellow-breasted chat	*Icteria virens*	G5	S4B			SC	Y	1.05	View in Wildlife Viewer; View Habitat Map (pdf)
17	Silver-haired bat	*Lasionycteris noctivagans*	G3G4	S3S4			S	Y	0.88	View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report

45.4639°N, -122.2951°W

#	Common Name	Scientific Name	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
18	Hoary bat	*Lasiurus cinereus*	*G3G4*	*S3*		*No status*	*S*	*Y*	*0.88*	View in Wildlife Viewer; View Habitat Map (pdf)
19	Hooded merganser	*Lophodytes cucullatus*	*G5*	*S4*					*3.26*	View in Wildlife Viewer; View Habitat Map (pdf)
20	Common merganser	*Mergus merganser*	*G5*	*S4*					*2.04*	View in Wildlife Viewer; View Habitat Map (pdf)
21	California myotis	*Myotis californicus*	*G5*	*S3*			*S*	*Y*	*1.03*	View in Wildlife Viewer; View Habitat Map (pdf)
22	Long-eared myotis	*Myotis evotis*	*G5*	*S4*					*1.02*	View in Wildlife Viewer; View Habitat Map (pdf)
23	Little brown myotis	*Myotis lucifugus*	*G3G4*	*S3*		*UR*			*1.03*	View in Wildlife Viewer; View Habitat Map (pdf)
24	Fringed myotis	*Myotis thysanodes*	*G4*	*S2*			*S*	*Y*	*1.83*	View in Wildlife Viewer; View Habitat Map (pdf)
25	Long-legged myotis	*Myotis volans*	*G4G5*	*S3*			*S*	*Y*	*1.02*	View in Wildlife Viewer; View Habitat Map (pdf)
26	Yuma myotis	*Myotis yumanensis*	*G5*	*S3*					*1.05*	View in Wildlife Viewer; View Habitat Map (pdf)
27	Coho salmon (Lower Columbia River ESU)	*Oncorhynchus kisutch pop. 1*	*G5T2Q*	*S2*	*Y*	*T*	*LE*	*Y*	*3.02*	
28	Steelhead (Lower Columbia River ESU,	*Oncorhynchus mykiss pop. 27*	*G5T2Q*	*S2*	*Y*	*T*	*SC*	*Y*	*2.62*	

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Biodiversity Report

45.4639°N, -122.2951°W

#	Common Name	Scientific Name	Relative Abundance Index	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Links
29	Chinook salmon (Lower Columbia River	*Oncorhynchus tshawytscha pop. 21*	*6.22*	*G5T2Q*	*S2*		*T*	*SC*	*Y*	
30	Chinook salmon (Lower Columbia River	*Oncorhynchus tshawytscha pop. 22*	*13.17*	*G5T2Q*	*S2*		*T*	*SC*	*Y*	
31	Band-tailed pigeon	*Patagioenas fasciata*	*1.08*	*G4*	*S3B*	*Y*				View in Wildlife Viewer; View Habitat Map (pdf)
32	Dunn's salamander	*Plethodon dunni*	*1.1*	*G4*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
33	Purple martin	*Progne subis*	*2.18*	*G5*	*S2B*			*SC*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
34	Cascade torrent salamander	*Rhyacotriton cascadae*	*1.15*	*G3*	*S2S3*		*UR*	*S*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
35	Pacific water shrew	*Sorex bendirii*	*0.89*	*G4*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
36	Vagrant shrew	*Sorex vagrans*	*1.05*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
37	Northern rough-winged swallow	*Stelgidopteryx serripennis*	*2.39*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
38	Eastern kingbird	*Tyrannus tyrannus*	*6.34*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report 45.4639°N, -122.2951°W

Animal Species in Sub-watershed

Trout Creek-Sandy River (170800010702)

*** See Appendix for Status and Rank Code Lookup*

#	Common Name	Scientific Name	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
1	Cooper's hawk	*Accipiter cooperii*	*G5*	*S4*					*0.93*	View in Wildlife Viewer; View Habitat Map (pdf)
2	Northern goshawk	*Accipiter gentilis*	*G5*	*S3S4*		*No status*	*S*	*Y*	*1.07*	View in Wildlife Viewer; View Habitat Map (pdf)
3	Sharp-shinned hawk	*Accipiter striatus*	*G5*	*S4*		*PS*			*0.89*	View in Wildlife Viewer; View Habitat Map (pdf)
4	Northern saw-whet owl	*Aegolius acadicus*	*G5*	*S4?*					*0.91*	View in Wildlife Viewer; View Habitat Map (pdf)
5	Clouded salamander	*Aneides ferreus*	*G3G4*	*S3S4*			*S*	*Y*	*0.97*	View in Wildlife Viewer; View Habitat Map (pdf)
6	Red tree vole	*Arborimus longicaudus*	*G2G3*	*S2S3*		*PS:C*	*S*	*Y*	*1.07*	View in Wildlife Viewer; View Habitat Map (pdf)
7	Oregon slender salamander	*Batrachoseps wrighti*	*G3*	*S3*		*SOC*	*S*	*Y*	*1.04*	View in Wildlife Viewer; View Habitat Map (pdf)
8	Hermit thrush	*Catharus guttatus*	*G5*	*S4*					*0.97*	View in Wildlife Viewer; View Habitat Map (pdf)
9	Swainson's thrush	*Catharus ustulatus*	*G5*	*S4S5B*					*0.88*	View in Wildlife Viewer; View Habitat Map (pdf)
10	Brown creeper	*Certhia americana*	*G5*	*S4*					*0.92*	View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report 45.4639°N, -122.2951°W

#	Common Name	Global Rank	State Rank	FPA	Scientific Name	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
11	Racer	*G5*	*S4?*		*Coluber constrictor*				*1.65*	View in Wildlife Viewer; View Habitat Map (pdf)
12	Western wood-pewee	*G5*	*S4*		*Contopus sordidulus*				*0.89*	View in Wildlife Viewer; View Habitat Map (pdf)
13	Ringneck snake	*G5*	*S4?*		*Diadophis punctatus*	*No status*			*1.46*	View in Wildlife Viewer; View Habitat Map (pdf)
14	Pileated woodpecker	*G5*	*S4*		*Dryocopus pileatus*		*S*	*Y*	*0.91*	View in Wildlife Viewer; View Habitat Map (pdf)
15	Pacific slope flycatcher	*G5*	*S4B*		*Empidonax difficilis*				*0.91*	View in Wildlife Viewer; View Habitat Map (pdf)
16	Hammond's flycatcher	*G5*	*S4*		*Empidonax hammondii*				*0.93*	View in Wildlife Viewer; View Habitat Map (pdf)
17	Macgillivray's warbler	*G5*	*S4B*		*Geothlypis tolmiei*				*1.06*	View in Wildlife Viewer; View Habitat Map (pdf)
18	Northern pygmy-owl	*G4G5*	*S4*		*Glaucidium gnoma*				*0.88*	View in Wildlife Viewer; View Habitat Map (pdf)
19	Humboldt's flying squirrel	*G5*	*S4*		*Glaucomys oregonensis*				*0.83*	View in Wildlife Viewer; View Habitat Map (pdf)
20	Purple finch	*G5*	*S4?*		*Haemorhous purpureus*				*1.05*	View in Wildlife Viewer; View Habitat Map (pdf)
21	Bullock's oriole	*G5*	*S4B*		*Icterus bullockii*				*3.32*	View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report

45.4639°N, -122.2951°W

#	Common Name	Ranks	Scientific Name	Status	Relative Abundance Index	Links
22	Varied thrush	Global Rank: *G5* State Rank: *S4* FPA:	*Ixoreus naevius*	Federal Status: State Rank: Strategy Species:	*0.91*	View in Wildlife Viewer View Habitat Map (pdf)
23	Red crossbill	Global Rank: *G5* State Rank: *S4* FPA:	*Loxia curvirostra*	Federal Status: State Rank: Strategy Species:	*0.86*	View in Wildlife Viewer View Habitat Map (pdf)
24	Bobcat	Global Rank: *G5* State Rank: *S4* FPA:	*Lynx rufus*	Federal Status: *No status* State Rank: Strategy Species:	*0.89*	View in Wildlife Viewer View Habitat Map (pdf)
25	Western screech-owl	Global Rank: *G4G5* State Rank: *S4?* FPA:	*Megascops kennicottii*	Federal Status: State Rank: Strategy Species:	*1.1*	View in Wildlife Viewer View Habitat Map (pdf)
26	Townsend's solitaire	Global Rank: *G5* State Rank: *S4* FPA:	*Myadestes townsendi*	Federal Status: State Rank: Strategy Species:	*1.45*	View in Wildlife Viewer View Habitat Map (pdf)
27	Western red-backed vole	Global Rank: *G5* State Rank: *S4* FPA:	*Myodes californicus*	Federal Status: State Rank: Strategy Species:	*0.83*	View in Wildlife Viewer View Habitat Map (pdf)
28	Townsend's chipmunk	Global Rank: *G5* State Rank: *S4* FPA:	*Neotamias townsendii*	Federal Status: State Rank: Strategy Species:	*0.86*	View in Wildlife Viewer View Habitat Map (pdf)
29	Shrew-mole	Global Rank: *G5* State Rank: *S4* FPA:	*Neurotrichus gibbsii*	Federal Status: State Rank: Strategy Species:	*0.91*	View in Wildlife Viewer View Habitat Map (pdf)
30	American pika	Global Rank: *G5* State Rank: *S2S3* FPA:	*Ochotona princeps*	Federal Status: State Rank: *S* Strategy Species: *Y*	*0.93*	View in Wildlife Viewer View Habitat Map (pdf)
31	Mountain quail	Global Rank: *G5* State Rank: *S3S4* FPA:	*Oreortyx pictus*	Federal Status: State Rank: *S* Strategy Species: *Y*	*1.01*	View in Wildlife Viewer View Habitat Map (pdf)
32	Nashville warbler	Global Rank: *G5* State Rank: *S4?B* FPA:	*Oreothlypis ruficapilla*	Federal Status: State Rank: Strategy Species:	*1.17*	View in Wildlife Viewer View Habitat Map (pdf)

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Biodiversity Report

45.4639°N, -122.2951°W

#	Common Name	Scientific Name	Relative Abundance Index	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Links
33	Lazuli bunting	*Passerina amoena*	*1.25*	*G5*	*S4B*					*View in Wildlife Viewer* / *View Habitat Map (pdf)*
34	Gray jay	*Perisoreus canadensis*	*1.05*	*G5*	*S4*					*View in Wildlife Viewer* / *View Habitat Map (pdf)*
35	Downy woodpecker	*Picoides pubescens*	*1.07*	*G5*	*S4*					*View in Wildlife Viewer* / *View Habitat Map (pdf)*
36	Hairy woodpecker	*Picoides villosus*	*0.92*	*G5*	*S4*					*View in Wildlife Viewer* / *View Habitat Map (pdf)*
37	Larch Mountain salamander	*Plethodon larselli*	*1.83*	*G2G3*	*S2?*		*SOC*	*SC*	*Y*	*View in Wildlife Viewer* / *View Habitat Map (pdf)*
38	Golden-crowned kinglet	*Regulus satrapa*	*0.99*	*G5*	*S3*					*View in Wildlife Viewer* / *View Habitat Map (pdf)*
39	Townsend's mole	*Scapanus townsendii*	*1.41*	*G5*	*S4*					*View in Wildlife Viewer* / *View Habitat Map (pdf)*
40	Western gray squirrel	*Sciurus griseus*	*1.07*	*G5*	*S4*			*S*	*Y*	*View in Wildlife Viewer* / *View Habitat Map (pdf)*
41	Hermit warbler	*Setophaga occidentalis*	*0.86*	*G4G5*	*S4*					*View in Wildlife Viewer* / *View Habitat Map (pdf)*
42	Western bluebird	*Sialia mexicana*	*1.25*	*G5*	*S4B,S4N*			*S*	*Y*	*View in Wildlife Viewer* / *View Habitat Map (pdf)*
43	Pacific shrew	*Sorex pacificus*	*0.9*	*G5*	*S3S4*					*View in Wildlife Viewer* / *View Habitat Map (pdf)*

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Biodiversity Report

45.4639°N, -122.2951°W

#	Common Name	Scientific Name	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
44	Trowbridge's shrew	*Sorex trowbridgii*	*G5*	*S4*					*0.89*	View in Wildlife Viewer; View Habitat Map (pdf)
45	Red-breasted sapsucker	*Sphyrapicus ruber*	*G5*	*S4*					*0.91*	View in Wildlife Viewer; View Habitat Map (pdf)
46	Western spotted skunk	*Spilogale gracilis*	*G5*	*S4*					*1.04*	View in Wildlife Viewer; View Habitat Map (pdf)
47	Chipping sparrow	*Spizella passerina*	*G5*	*S4B*			*S*	*Y*	*1.04*	View in Wildlife Viewer; View Habitat Map (pdf)
48	Common gray fox	*Urocyon cinereoargenteus*	*G5*	*S4*					*0.91*	View in Wildlife Viewer; View Habitat Map (pdf)
49	Cassin's vireo	*Vireo cassinii*	*G5*	*S4?B*					*0.96*	View in Wildlife Viewer; View Habitat Map (pdf)
50	Hutton's vireo	*Vireo huttoni*	*G5*	*S4*					*1.08*	View in Wildlife Viewer; View Habitat Map (pdf)
51	Red-eyed vireo	*Vireo olivaceus*	*G5*	*S3S4B*					*4.98*	View in Wildlife Viewer; View Habitat Map (pdf)
52	Pacific jumping mouse	*Zapus trinotatus*	*G5*	*S4*					*1.04*	View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report

45.4639°N, -122.2951°W

Ecological Systems in Sub-watershed

Trout Creek-Sandy River (170800010702)

West Cascades Ecosection

	Ecological System	Relative Abundance Index
1	*Agriculture - Irrigated*	*16.205052*
2	*Westside Douglas-fir or Madrone*	*14.806456*
3	*Red Alder or Bigleaf Maple*	*9.348024*
4	*Westside Lowland Prairie and Savanna*	*5.382645*
5	*Agriculture - Hay/pasture*	*4.418332*
6	*Freshwater Mudflat*	*3.495445*
7	*Big Leaf Maple - Douglas-fir*	*2.953334*
8	*Developed, Low Intensity*	*2.646903*
9	*Westside Lowland Riparian*	*2.605952*
10	*Westside Forested or Shrub Wetland*	*2.487389*
11	*Westside Valley Wet Prairie*	*2.482647*
12	*Developed, Open Space (Roads, Parks, Golf Courses, Open Space)*	*2.034087*
13	*Westside Grass Bald or Bluff*	*1.753136*
14	*Oregon White Oak*	*1.666844*
15	*Water*	*1.523795*
16	*High Structure Agriculture*	*0.873339*
17	*Harvested Forest - Tree Regeneration*	*0.692552*
18	*Dry-site Douglas-fir - Western Hemlock*	*0.39589*
19	*Moist-site Western Hemlock - Douglas-fir*	*0.282684*
20	*Harvested Forest - Grass Regeneration*	*0.25218*
21	*Developed, Medium Intensity*	*0.172492*
22	*Harvested Forest - Herbaceous Regeneration*	*0.159351*
23	*Harvested Forest - Shrub Regeneration*	*0.007682*

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Biodiversity Report

45.4621°N, -122.3041°W

Location Information

Latitude:	45°27'44"N	Longitude:	-122°18'15"W
Latitutde (Decimal Minutes):	45°27.7333'N	Longitude (Decimal Minutes):	-122°18.25'W
Latitutde (Decimal Degrees):	45.4621°N	Longitude (Decimal Degrees):	-122.3041°W
USGS Quad:	Sandy, 45122-D3	Maidenhead Grid Square (ARRL):	CN85UL
Legal (Township Range Section):	Section 22 of Township S1, Range E4	County:	Multnomah County
Magnetic Declination:	Not Available		
Elevation:	Not Available	Avg Annual Precipitation:	58 in (inches)
Watershed (10 Digit HUC):	Johnson Creek (1709001201)		
Sub-watershed (12 Digit HUC):	Upper Johnson Creek (170900120101)		
Fire Protection District:	N/A	ODF Regulated Use:	Not Available
Fire Weather Zone:	604	ODFW Wildlife Management Unit:	WILLAMETTE
Public Ownership:	Private -		

Animal Species (Aquatic Habitat Associated) in Sub-watershed

Upper Johnson Creek (170900120101)

*** See Appendix for Status and Rank Code Lookup*

#	Common Name	Scientific Name	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
1	Western pond turtle	*Actinemys marmorata*	*G3*	*S2*		*SOC*	*SC*	*Y*	*0.98*	*View in Wildlife Viewer* *View Habitat Map (pdf)*
2	Western toad	*Anaxyrus boreas*	*G4*	*S4*			*S*	*Y*	*2.59*	*View in Wildlife Viewer* *View Habitat Map (pdf)*
3	Great blue heron	*Ardea herodias*	*G5*	*S4*	*Y*				*1.04*	*View in Wildlife Viewer* *View Habitat Map (pdf)*
4	Green heron	*Butorides virescens*	*G5*	*S4*					*1.03*	*View in Wildlife Viewer* *View Habitat Map (pdf)*
5	Vaux's swift	*Chaetura vauxi*	*G5*	*S4B*					*1.32*	*View in Wildlife Viewer* *View Habitat Map (pdf)*
6	Painted turtle	*Chrysemys picta*	*G5*	*S2*			*SC*	*Y*	*1.15*	*View in Wildlife Viewer* *View Habitat Map (pdf)*

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Biodiversity Report

45.4621°N, -122.3041°W

#	Common Name	Scientific Name	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
7	Olive-sided flycatcher	*Contopus cooperi*	G4	S2S3B			SC/S	Y	0.69	View in Wildlife Viewer; View Habitat Map (pdf)
8	Townsend's big-eared bat	*Corynorhinus townsendii*	G4	S2		No status	SC	Y	1.54	View in Wildlife Viewer; View Habitat Map (pdf)
9	Willow flycatcher	*Empidonax traillii*	G5	S3B		PS		Y	0.07	View in Wildlife Viewer; View Habitat Map (pdf)
10	Big brown bat	*Eptesicus fuscus*	G5	S4					1.02	View in Wildlife Viewer; View Habitat Map (pdf)
11	Bald eagle	*Haliaeetus leucocephalus*	G5	S4B,S4N	Y	DL			1.11	View in Wildlife Viewer; View Habitat Map (pdf)
12	Yellow-breasted chat	*Icteria virens*	G5	S4B			SC	Y	1.52	View in Wildlife Viewer; View Habitat Map (pdf)
13	Silver-haired bat	*Lasionycteris noctivagans*	G3G4	S3S4			S	Y	0.69	View in Wildlife Viewer; View Habitat Map (pdf)
14	Hoary bat	*Lasiurus cinereus*	G3G4	S3		No status	S	Y	1.08	View in Wildlife Viewer; View Habitat Map (pdf)
15	Hooded merganser	*Lophodytes cucullatus*	G5	S4					1.47	View in Wildlife Viewer; View Habitat Map (pdf)
16	Common merganser	*Mergus merganser*	G5	S4					0.11	View in Wildlife Viewer; View Habitat Map (pdf)
17	California myotis	*Myotis californicus*	G5	S3			S	Y	1.02	View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report

45.4621°N, -122.3041°W

#	Common Name	Scientific Name	Relative Abundance Index	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Links
18	Long-eared myotis	*Myotis evotis*	*0.94*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
19	Little brown myotis	*Myotis lucifugus*	*1.02*	*G3G4*	*S3*		*UR*			View in Wildlife Viewer; View Habitat Map (pdf)
20	Fringed myotis	*Myotis thysanodes*	*1.06*	*G4*	*S2*			*S*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
21	Long-legged myotis	*Myotis volans*	*0.94*	*G4G5*	*S3*			*S*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
22	Yuma myotis	*Myotis yumanensis*	*1.01*	*G5*	*S3*					View in Wildlife Viewer; View Habitat Map (pdf)
23	Coho salmon (Lower Columbia River ESU)	*Oncorhynchus kisutch pop. 1*	*8.14*	*G5T2Q*	*S2*	*Y*	*T*	*LE*	*Y*	
24	Steelhead (Lower Columbia River ESU,	*Oncorhynchus mykiss pop. 27*	*8.68*	*G5T2Q*	*S2*	*Y*	*T*	*SC*	*Y*	
25	Band-tailed pigeon	*Patagioenas fasciata*	*0.69*	*G4*	*S3B*	*Y*				View in Wildlife Viewer; View Habitat Map (pdf)
26	Purple martin	*Progne subis*	*1.66*	*G5*	*S2B*			*SC*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
27	Pacific water shrew	*Sorex bendirii*	*0.72*	*G4*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
28	Vagrant shrew	*Sorex vagrans*	*1.02*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report
45.4621°N, -122.3041°W

29	Northern rough-winged swallow	*Stelgidopteryx serripennis*	Relative Abundance Index: *1.17*	
	Global Rank: *G5*	Federal Status:		*View in Wildlife Viewer*
	State Rank: *S4*	State Rank:		
	FPA:	Strategy Species:		*View Habitat Map (pdf)*

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Biodiversity Report

45.4621°N, -122.3041°W

Animal Species in Sub-watershed

Upper Johnson Creek (170900120101)

*** See Appendix for Status and Rank Code Lookup*

#	Common Name	Scientific Name	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
1	Cooper's hawk	*Accipiter cooperii*	*G5*	*S4*					*1.14*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
2	Sharp-shinned hawk	*Accipiter striatus*	*G5*	*S4*		*PS*			*0.97*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
3	Northern saw-whet owl	*Aegolius acadicus*	*G5*	*S4?*					*0.81*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
4	Clouded salamander	*Aneides ferreus*	*G3G4*	*S3S4*			*S*	*Y*	*1.28*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
5	Red tree vole	*Arborimus longicaudus*	*G2G3*	*S2S3*		*PS:C*	*S*	*Y*	*1.09*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
6	Oregon slender salamander	*Batrachoseps wrighti*	*G3*	*S3*		*SOC*	*S*	*Y*	*2.6*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
7	Lesser goldfinch	*Carduelis psaltria*	*G5*	*S4*					*1.38*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
8	Swainson's thrush	*Catharus ustulatus*	*G5*	*S4S5B*					*0.69*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
9	Brown creeper	*Certhia americana*	*G5*	*S4*					*1.12*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*
10	Racer	*Coluber constrictor*	*G5*	*S4?*					*0.97*	*View in Wildlife Viewer*; *View Habitat Map (pdf)*

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Biodiversity Report

45.4621°N, -122.3041°W

#	Common Name	Global Rank	State Rank	FPA	Scientific Name	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
11	Western wood-pewee	*G5*	*S4*		*Contopus sordidulus*				*1.13*	View in Wildlife Viewer; View Habitat Map (pdf)
12	Ringneck snake	*G5*	*S4?*		*Diadophis punctatus*	*No status*			*0.97*	View in Wildlife Viewer; View Habitat Map (pdf)
13	Pileated woodpecker	*G5*	*S4*		*Dryocopus pileatus*		*S*	*Y*	*1.35*	View in Wildlife Viewer; View Habitat Map (pdf)
14	Pacific slope flycatcher	*G5*	*S4B*		*Empidonax difficilis*				*0.88*	View in Wildlife Viewer; View Habitat Map (pdf)
15	Hammond's flycatcher	*G5*	*S4*		*Empidonax hammondii*				*1.06*	View in Wildlife Viewer; View Habitat Map (pdf)
16	Macgillivray's warbler	*G5*	*S4B*		*Geothlypis tolmiei*				*0.69*	View in Wildlife Viewer; View Habitat Map (pdf)
17	Northern pygmy-owl	*G4G5*	*S4*		*Glaucidium gnoma*				*0.69*	View in Wildlife Viewer; View Habitat Map (pdf)
18	Purple finch	*G5*	*S4?*		*Haemorhous purpureus*				*0.98*	View in Wildlife Viewer; View Habitat Map (pdf)
19	Bullock's oriole	*G5*	*S4B*		*Icterus bullockii*				*1.74*	View in Wildlife Viewer; View Habitat Map (pdf)
20	Varied thrush	*G5*	*S4*		*Ixoreus naevius*				*1.09*	View in Wildlife Viewer; View Habitat Map (pdf)
21	Red crossbill	*G5*	*S4*		*Loxia curvirostra*				*1.22*	View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report

45.4621°N, -122.3041°W

#	Common Name	Scientific Name	Relative Abundance Index	Global Rank	State Rank	FPA	Federal Status	State Rank	Strategy Species	Links
22	Bobcat	*Lynx rufus*	*0.94*	*G5*	*S4*		*No status*			View in Wildlife Viewer; View Habitat Map (pdf)
23	Western screech-owl	*Megascops kennicottii*	*1.09*	*G4G5*	*S4?*					View in Wildlife Viewer; View Habitat Map (pdf)
24	Western red-backed vole	*Myodes californicus*	*0.77*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
25	Townsend's chipmunk	*Neotamias townsendii*	*1.12*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
26	Shrew-mole	*Neurotrichus gibbsii*	*0.69*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
27	American pika	*Ochotona princeps*	*1.37*	*G5*	*S2S3*			*S*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
28	Mountain quail	*Oreortyx pictus*	*0.7*	*G5*	*S3S4*			*S*	*Y*	View in Wildlife Viewer; View Habitat Map (pdf)
29	Lazuli bunting	*Passerina amoena*	*0.95*	*G5*	*S4B*					View in Wildlife Viewer; View Habitat Map (pdf)
30	Downy woodpecker	*Picoides pubescens*	*1.14*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
31	Hairy woodpecker	*Picoides villosus*	*1.28*	*G5*	*S4*					View in Wildlife Viewer; View Habitat Map (pdf)
32	Golden-crowned kinglet	*Regulus satrapa*	*1.19*	*G5*	*S3*					View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report

45.4621°N, -122.3041°W

#	Common Name	Global Rank	State Rank	FPA	Scientific Name	Federal Status	State Rank	Strategy Species	Relative Abundance Index	Links
33	Townsend's mole	*G5*	*S4*		*Scapanus townsendii*				*1.03*	View in Wildlife Viewer; View Habitat Map (pdf)
34	Western gray squirrel	*G5*	*S4*		*Sciurus griseus*		*S*	*Y*	*1.29*	View in Wildlife Viewer; View Habitat Map (pdf)
35	Hermit warbler	*G4G5*	*S4*		*Setophaga occidentalis*				*1.18*	View in Wildlife Viewer; View Habitat Map (pdf)
36	Western bluebird	*G5*	*S4B,S4N*		*Sialia mexicana*		*S*	*Y*	*0.93*	View in Wildlife Viewer; View Habitat Map (pdf)
37	Pacific shrew	*G5*	*S3S4*		*Sorex pacificus*				*0.99*	View in Wildlife Viewer; View Habitat Map (pdf)
38	Trowbridge's shrew	*G5*	*S4*		*Sorex trowbridgii*				*0.8*	View in Wildlife Viewer; View Habitat Map (pdf)
39	Red-breasted sapsucker	*G5*	*S4*		*Sphyrapicus ruber*				*1.18*	View in Wildlife Viewer; View Habitat Map (pdf)
40	Western spotted skunk	*G5*	*S4*		*Spilogale gracilis*				*0.03*	View in Wildlife Viewer; View Habitat Map (pdf)
41	Chipping sparrow	*G5*	*S4B*		*Spizella passerina*		*S*	*Y*	*1.13*	View in Wildlife Viewer; View Habitat Map (pdf)
42	Common gray fox	*G5*	*S4*		*Urocyon cinereoargenteus*				*0.87*	View in Wildlife Viewer; View Habitat Map (pdf)
43	Cassin's vireo	*G5*	*S4?B*		*Vireo cassinii*				*0.7*	View in Wildlife Viewer; View Habitat Map (pdf)

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Biodiversity Report

45.4621°N, -122.3041°W

44	Hutton's vireo	*Vireo huttoni*	Relative Abundance Index: *0.69*	
	Global Rank: *G5* State Rank: *S4* FPA:		Federal Status: State Rank: Strategy Species:	View in Wildlife Viewer View Habitat Map (pdf)
45	Pacific jumping mouse	*Zapus trinotatus*	Relative Abundance Index: *0.84*	
	Global Rank: *G5* State Rank: *S4* FPA:		Federal Status: State Rank: Strategy Species:	View in Wildlife Viewer View Habitat Map (pdf)

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Biodiversity Report

45.4621°N, -122.3041°W

Ecological Systems in Sub-watershed

Upper Johnson Creek (170900120101)

Willamette Valley Ecosection

	Ecological System	Relative Abundance Index
1	*Developed, Open Space (Roads, Parks, Golf Courses, Open Space)*	*2.927051*
2	*Developed, Low Intensity*	*2.811406*
3	*Developed, Medium Intensity*	*2.516991*
4	*Big Leaf Maple - Douglas-fir*	*2.198504*
5	*High Structure Agriculture*	*2.119963*
6	*Westside Douglas-fir or Madrone*	*1.128182*
7	*Developed, High Intensity*	*1.017368*
8	*Agriculture - Irrigated*	*0.70634*
9	*Agriculture - Hay/pasture*	*0.675784*
10	*Westside Lowland Prairie and Savanna*	*0.627735*
11	*Westside Forested or Shrub Wetland*	*0.430531*
12	*Red Alder or Bigleaf Maple*	*0.217245*
13	*Moist-site Western Hemlock - Douglas-fir*	*0.117149*
14	*Oregon White Oak*	*0.107998*
15	*Harvested Forest - Grass Regeneration*	*0.100626*
16	*Westside Valley Wet Prairie*	*0.04354*
17	*Water*	*0.035477*
18	*Harvested Forest - Tree Regeneration*	*0.029275*
19	*Recently Burned Forest*	*0.008106*
20	*Dry-site Douglas-fir - Western Hemlock*	*0.001157*

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Attachment E: Author Bios

LAUREN COURTER, Ph.D.
Toxicologist

Lauren Courter is a toxicologist and a co-founding scientist of Mount Hood Environmental (MHE), an Oregon-based science consulting company with additional staff in Washington and Idaho. MHE specializes in fisheries research, water quality monitoring, and aquatic toxicology. For nearly thirteen years she has been a principal investigator on aquatic toxicology and water quality research, regularly contributing to various MHE technical writing assignments covering a wide variety of topics. Prior to MHE, Lauren engaged in eight years of academic research in the fields of carcinogenesis, molecular toxicology and neurobiology. Her graduate and post-graduate work focused on the genotoxicity of polycyclic aromatic hydrocarbons and toxicant effects on neurodevelopment, respectively. She has a Ph.D in Toxicology from Oregon State University and a bachelor's degree in Biology with a minor in Business Administration from Pacific University.

Lauren is an expert in the study of non-target impacts of herbicides on aquatic and human health. She has written numerous reports and is well-published in her field. More specifically, her consulting research focuses on the effects of terrestrial and aquatic herbicide applications on sensitive aquatic species, relic sediment contamination on ESA-listed salmonid species, and water quality and nutrient monitoring. Her research has spanned basins across Oregon and Washington, including the Deschutes, Willamette and Upper Columbia basins. Lauren regularly serves as a consultant to several private timber companies leading herbicide monitoring efforts on the Oregon coast to determine non-target impacts of and the risks associated with silvicultural operations on human health and aquatic species. She has also served as a legal expert on several issues, including aquatic toxicity work in Douglas County, Oregon on an accidental release of concrete into the Umpqua River. More recently, she has been contracted as an expert to review and disseminate existing contaminant data and literature for the Portland Harbor Superfund Site.

IAN COURTER, M.S.
Senior Fisheries Scientist

Ian Courter is a cofounder of Mount Hood Environmental (MHE), an Oregon-based science consulting company with additional staff in Washington and Idaho. MHE specializes in fisheries research, water quality monitoring, and aquatic toxicology. Prior to establishing MHE, Ian provided project leadership, management, design, analysis, and data collection for Cramer Fish Sciences in Gresham, Oregon. In addition to his role as a senior scientist, Ian served as the Program Lead for Oregon operations. He has a Master's degree in Fisheries Science with a minor in Natural Resource Policy and Law from Oregon State University, a bachelor's degree in Environmental Biology from Pacific University, and a Project Management certification from Portland State University, among other certifications.

Ian has served as principal investigator on a variety of salmonid research projects in the Cowlitz, Klamath, Willamette, Yakima, Wenatchee, Methow, Deschutes, Owyhee, Snake, Upper Columbia, and Sacramento/San Joaquin River Basins. Of particular note, Ian led population dynamics and stream habitat modeling projects in the Klamath, Yakima, and Deschutes River basins. The primary aim of these investigations was to quantify the effects of flow, temperature, and other habitat attributes on salmon and steelhead populations. For example, Ian led a team of scientists to quantify the effects of Bureau of Reclamation project operations on abundance of resident rainbow trout and anadromous steelhead in the Yakima River basin, Washington. Ian implemented a similar modeling approach to support water management decisions in the Upper Deschutes Basin, Oregon. Subsequent to these analyses, Ian led a team of researchers to develop a population viability model for Yakima Basin steelhead. This work was highlighted in the National Marine Fisheries Service life-cycle modeling report for the Columbia Basin, which documents available modeling approaches for assessing effects of management actions on ESA-listed anadromous salmonid populations.

Ian is an expert in the study of stream habitat carrying capacity. He has written numerous reports and publications and frequently gives technical presentations at regional science meetings, including Washington, Idaho, and Oregon Chapters of the American Fisheries Society, as well as the biennial Pacific Coast Steelhead Management Meeting convened by the Pacific States Marine Fisheries Commission. He is regularly invited to be a guest speaker at technical symposia and he provides technical review of research reports on behalf of clients, as well as peer-review for scientific publications. In addition to his modeling experience, Ian has designed and implemented a variety of customized field and laboratory data collection projects to address questions about water management, hydropower, and forestry impacts on anadromous fish. Specific examples include spring Chinook smolt survival studies in the Yakima River, Washington; adult lamprey migration monitoring in the Willamette River, Oregon and Snake River, Washington; instream flow studies in the Wenatchee and Methow Basins, Washington; redband trout monitoring and habitat capacity estimation in the Crooked River, Oregon; cutthroat trout surveys in the Umpqua Basin, Oregon; salmonid habitat surveys in the Yakima, Lewis, Sandy, Deschutes, and Owyhee River basins; steelhead and Coho entrainment monitoring in the Tualatin River, Oregon and bull trout entrainment monitoring in the Tieton River, Washington; salmonid predation monitoring in the Yakima River; salmon and steelhead angling studies in the Cowlitz River, Washington; Forest fire and tree stand density effects on stream habitat in Omak, Washington; and Coho Salmon habitat surveys in the Tillamook State Forest.

In addition to his research interests, Ian regularly serves as an expert advisor and analyst for water management agencies and resource user groups engaged in regulatory assessments, such as ESA consultations and Habitat Conservation Plans (HCP). MHE currently provides technical support for Klamath Basin Coho Salmon and Yakima Basin Steelhead Trout ESA Section 7 consultations, as well as the Deschutes Basin HCP.